TECHNOLOGY DEPT.

FEBRUARY 1951

The Paper Industry

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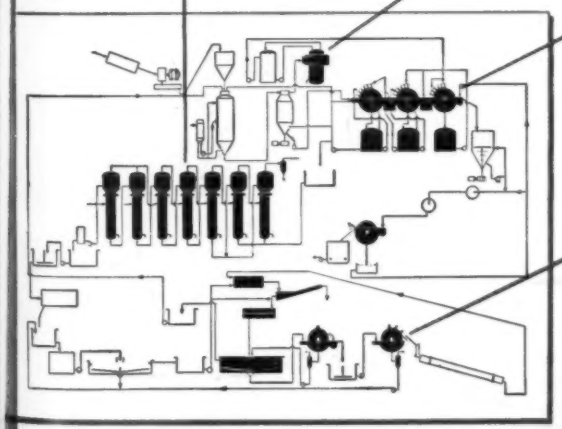
TECHNOLOGY DEPT.

Here Swenson Can Help You...

EVAPORATION

HEAT RECOVERY

PULP WASHING



FILTRATION

Send for Bulletin E-108

SWENSON

REG. U. S. PAT. OFF.

SWENSON EVAPORATOR COMPANY

DIVISION OF WHITING CORPORATION

15653 Lathrop Ave. Harvey, Illinois

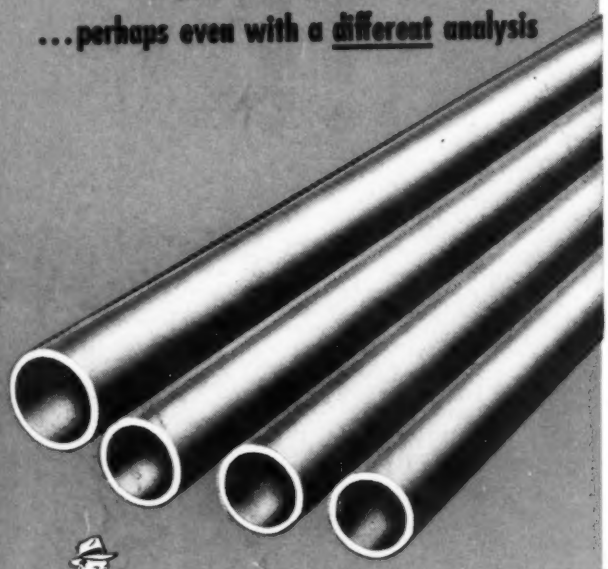
Eastern Sales Office and Export Department:
30 Church St., New York 7, N. Y.
In Canada: Whiting Corporation (Canada) Ltd.
47-49 LaPlante Ave., Toronto 2

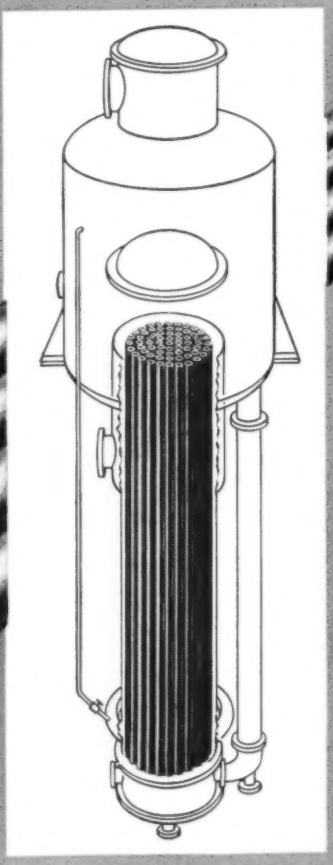
- Evaporators
- Pulp Washers • Deckers • Filters
- Digester Blow Condensers
- Surface Condensers
- Turpentine Condensers • Causticizers

to meet changing service requirements

...it might pay you to re-tube

...perhaps even with a <u>different</u> analysis





Ask a B&W Tube Representative...he can help you

Modern improvements in pulp and paper making operations impose a greater variety of requirements than ever before on alloy and stainless tubing . . . makes proper selection of analyses increasingly difficult. Your B&W Tube Representative may be able to show you . . .

FOR EXAMPLE

. . . how, in a given service, re-tubing with certain lower grades can give savings in initial cost without materially affecting performance; or how, under different conditions, switching to a higher alloy can pay service dividends far beyond a negligible increase in cost. Consult *your* B&W Tube Representative—his factory training in cost-saving "tube technics" and broad knowledge of pulp and paper mill applications can help you decide whether you are expecting too *much* . . . or too *little* . . . from your present tubing.

B&W SEAMLESS and WELDED TUBING for Pulp and Paper Mills

Carbon Steel	
*Nicloy 3½	(3¼—3¾% Nickel)
*Nicloy 5	(4¾—5¼% Nickel)
Croloy 18-8-S	(Type 304)
Croloy 18-12	(Type 305)
Croloy 16-13-3	(Type 316)
Croloy 18-13-3	(Type 317)
Croloy 18	(Type 430)

*Available seamless only.

In addition to the grades listed above, B&W makes seamless and welded tubing in a wide range of other stainless and alloy steel grades. Send for latest bulletins.

B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX TUBE COMPANY

General Offices: **Beaver Falls, Pa.**

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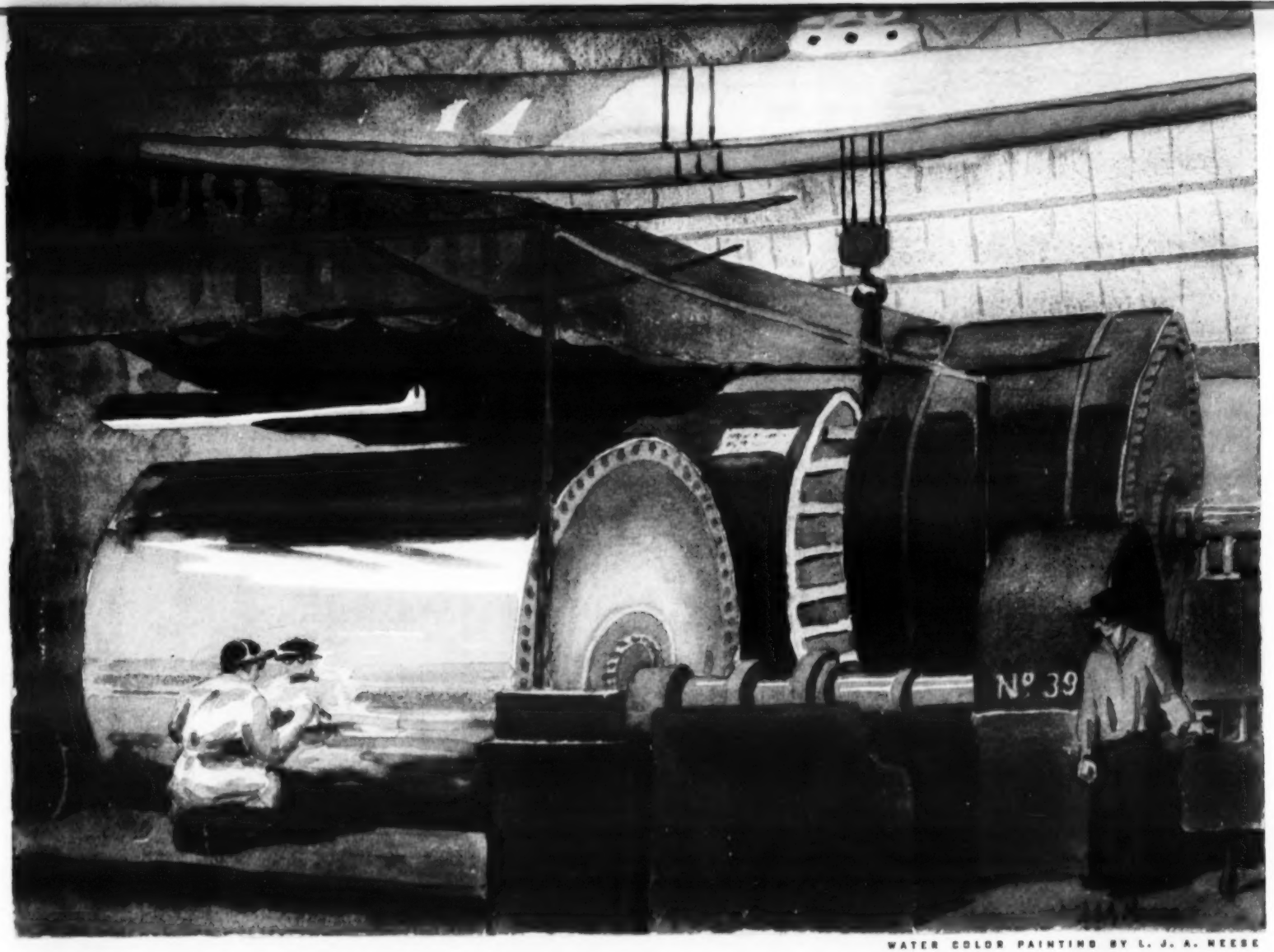
Sales Offices: Alliance, Ohio • Beaver Falls, Pa. • Boston 16, Mass. Chicago 3, Ill. • Cleveland 14, Ohio • Detroit 26, Mich. • Houston 2, Texas Los Angeles 15, Calif. • New York 16, N. Y. • Philadelphia 2, Pa • St. Louis 1, Mo. San Francisco 3, Calif. • Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla.

TA-1280-S



WATER COLOR PAINTING BY L. J. A. NEESE

"PRECISION REFLECTED"... Yankee Dryers in the Beloit Iron Works shop. Inspection of dryer in foreground follows polishing operations. Second dryer is ready for the grinder, third is crated, ready to ship. These huge cylinders, providing the maximum in drying capacity and perfection in finish, are the result of Beloit Iron Works' long experience and extensive research.

An Important Message for Every Paper Plant!

Why the Paper Industry Buys INFILCO Water Conditioning Equipment *Again and Again!*

No better testimonial of equipment performance could ever be sought or given than the many repeat purchases resulting from an initial mill installation. These mills have found that regardless of the type of raw water supply, the ACCELATOR® delivers a consistently uniform, clear water, free from product damaging turbidity, discoloration and chemicals. They have found, too, that the ACCELATOR saves them space..up to 80% over conventional water conditioning units. This is possible because quick mixing, coagulation, liquid-solids separation and automatic sludge removal are all carried out in a single compact basin!

You owe it to yourself to investigate the ACCELATOR, today. For a complete printed story of the ACCELATOR, its many advantages and applications, *send for the colorful 28 page Bulletin No. 1825.* If you have a specific problem, call in your nearest Infilco Field Engineer or write the executive offices at Tucson. There's no obligation to buy, of course..only the obligation to yourself to investigate the offerings of the leader—INFILCO.

SERVING THE PAPER INDUSTRY WITH WATER CONDITIONING EQUIPMENT THAT'S

Quality Engineered for Quality Performance

MULTIPLE USERS OF THE ACCELATOR

INTERNATIONAL PAPER CO., Natchez, Miss.
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INFILCO
BETTER WATER CONDITIONING AND WASTE TREATMENT SINCE 1894

INFILCO INC.
NEW YORK 17 • TUCSON • CHICAGO 16
SALES OFFICES IN TWENTY SIX PRINCIPAL CITIES
WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING EQUIPMENT

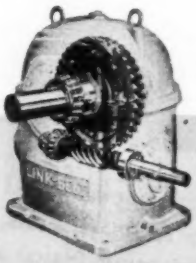
Speed reduction problem?

Is it Ratio? Space? Shock? Overload?

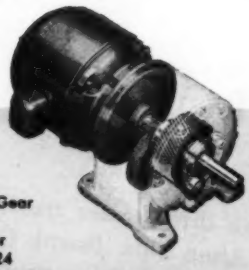
No *one* speed reducer solves *every* reduction problem. That's Why LINK-BELT Builds All 3

FOR the *right* speed reducer engineered to match your exact conditions, your best bet is Link-Belt. Link-Belt builds all three—Gearmotors, Herringbones, Worms. When a Link-Belt power transmission engineer analyzes your problem, he isn't tempted to fit his recommendation to a limited line.

You can also be sure that the Link-Belt unit recommended is engineered and built for tough operating conditions. And efficiency in power transmission is matched by flexibility in application!

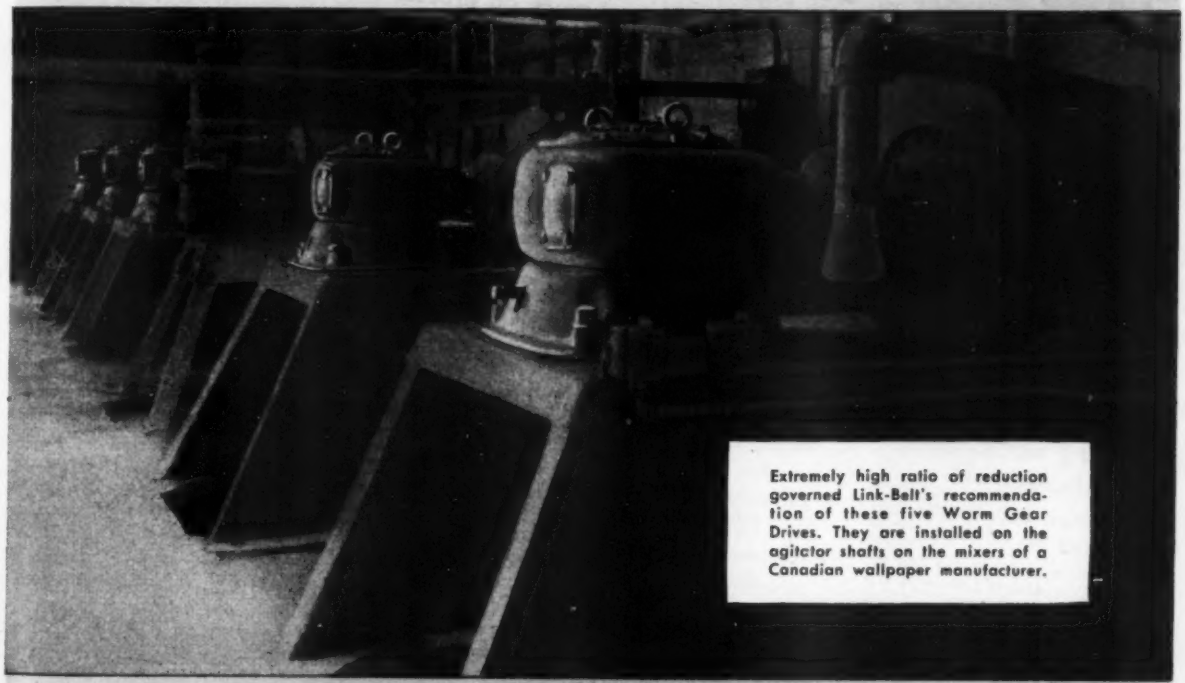


On Worm Gear Drives write for Book 2324



On Gearmotors write for Book 2247

On Herringbone Gear Drives write for Book 2419

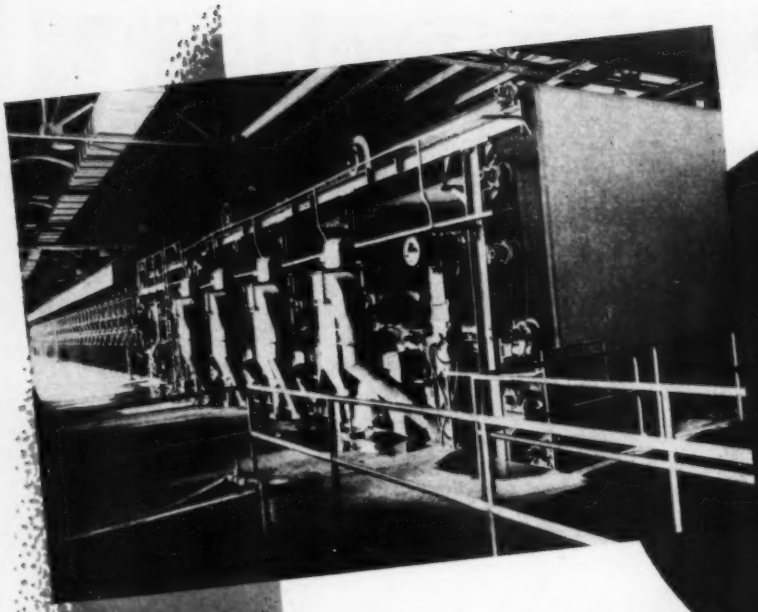


Extremely high ratio of reduction governed Link-Belt's recommendation of these five Worm Gear Drives. They are installed on the agitator shafts on the mixers of a Canadian wallpaper manufacturer.

LINK-BELT ENCLOSED GEAR DRIVES

12,242

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities.



Alton's No. 3 machine, world's record strawboard producer. Photo courtesy of Alton Box Board Company, Alton, Illinois.

3-WAY SERVICE

at Alton Box [illegible]ny

HERE are the three water treatment services performed by Nalco at Alton Box Board Company, Alton, Illinois. In addition, experimental work on process waters using Nalco anti-foam chemicals is now being done at Alton:

❶ SLIME CONTROL chemicals, fitted to Alton Box Board requirements, help maintain high quality . . . prevent slime spots and breaks due to slime.

❷ CLARIFICATION of mill water with Nalco #680 Sodium Aluminate . . . A versatile chemical also used widely for size control and maximum alum availability.

❸ BOILER WATER TREATMENT with specially-processed organic chemicals for use in high-capacity, high-pressure boilers.

Use of Nalco Chemicals and Services at Alton Box Board Company shows clearly the wide extent to which good water treatment, properly applied, can be utilized to make over-all mill operation cleaner, more efficient and more economical.

The Nalco System can be applied selectively, or for complete water treatment protection in *your* mill. Write today for full details on your specific water treatment problems.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place
Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

THE Nalco SYSTEM • **Serving the Paper Industry through Practical Applied Science**

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 32 • NUMBER 11 • FEBRUARY, 1951

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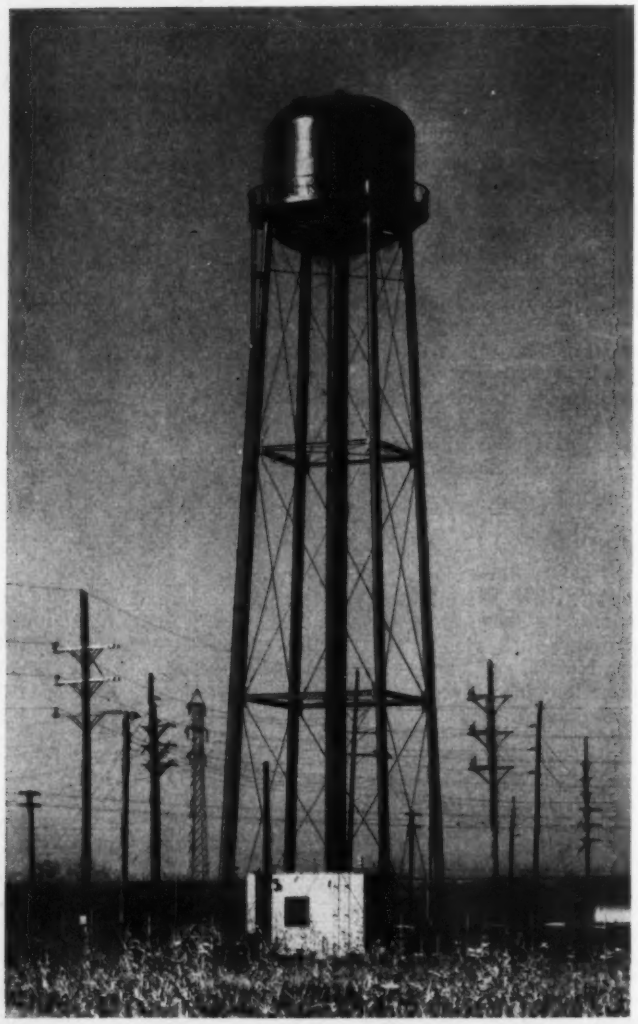

Get 'Round-the-Clock Water Service With a Horton Tank

If fire endangers your plant at 3 A.M. . . . or any other time of night or day . . . be sure you're properly equipped to stop it. Install an automatic sprinkler system and a Horton elevated water tank. This positive combination means fire protection you can always depend on.

Thousands of plants throughout the country realize that an automatic sprinkler system provides positive protection against fire only if it has an unfailing water supply. And that's exactly why these plants have installed Horton elevated water tanks.

Elevated storage utilizes one of nature's most dependable forces—*gravity*—to automatically provide water pressure at any hour. This is especially important during the early morning hours when plants are not generally frequented by employees and a blaze might get out of control before it is discovered.

Horton elevated water tanks with ellipsoidal bottoms are built in standard capacities ranging from 15,000 to 500,000 gallons. Their welded steel construction provides smoother surfaces for easier painting. Maintenance is reduced to a minimum.

So, when you're planning your automatic fire protection system—get the added protection of a gravity water supply. Write our nearest office today for complete details. We will be glad to furnish this information without obligation.

CHICAGO BRIDGE & IRON COMPANY

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Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
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Cleveland, 15.....2267 Guildhall Building
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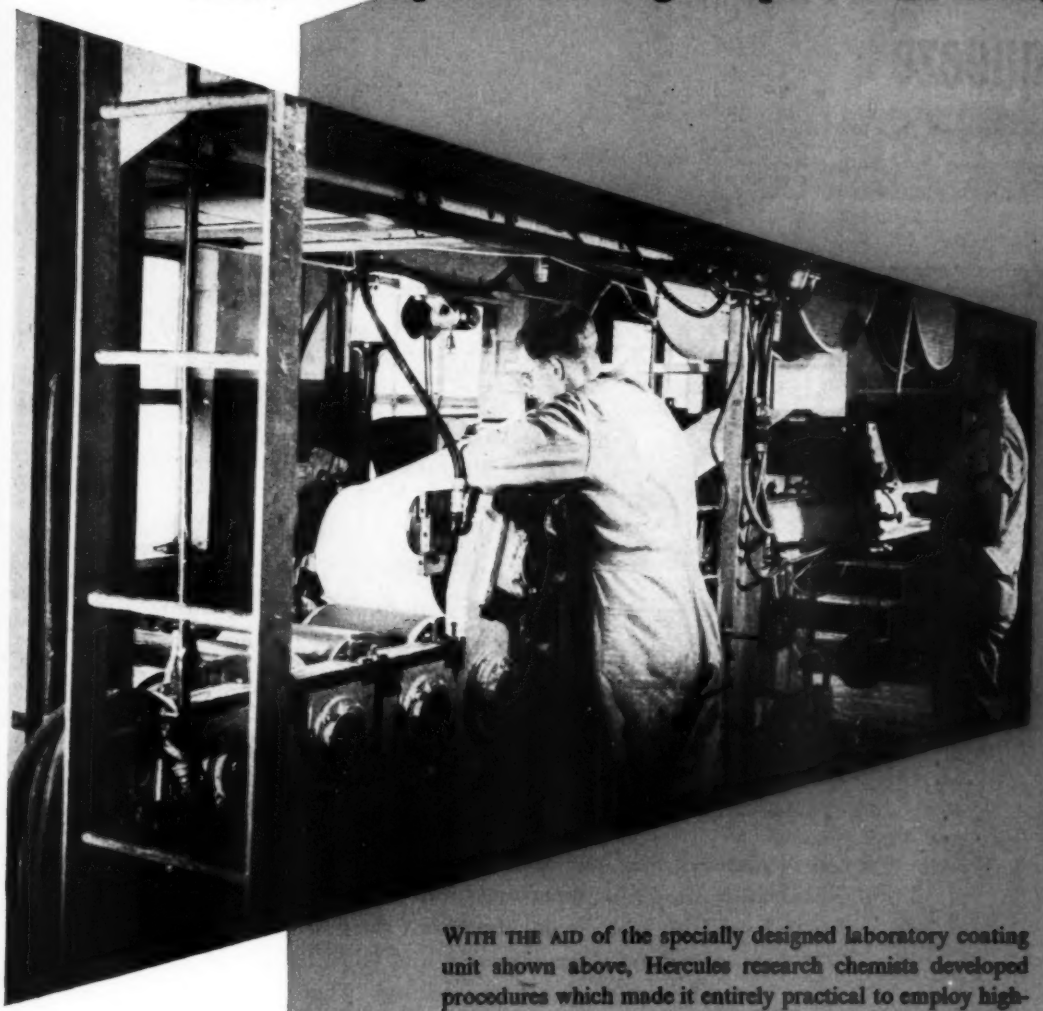
Houston, 2.....2143 National Standard Building
Los Angeles, 17.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3.....1653—1700 Walnut Street Building
Salt Lake City, 4.....527 West 17th South Street
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

ANOTHER PRACTICAL PAPER PROBLEM
SOLVED BY HERCULES RESEARCH

How High-Solids Casein-Bound Colors were Adapted to High-Speed Coating...



WITH THE AID of the specially designed laboratory coating unit shown above, Hercules research chemists developed procedures which made it entirely practical to employ high-solids casein-bound colors on high-speed machine coaters. Previously the properties of casein coating colors had limited their use to relatively low-speed coating operations.

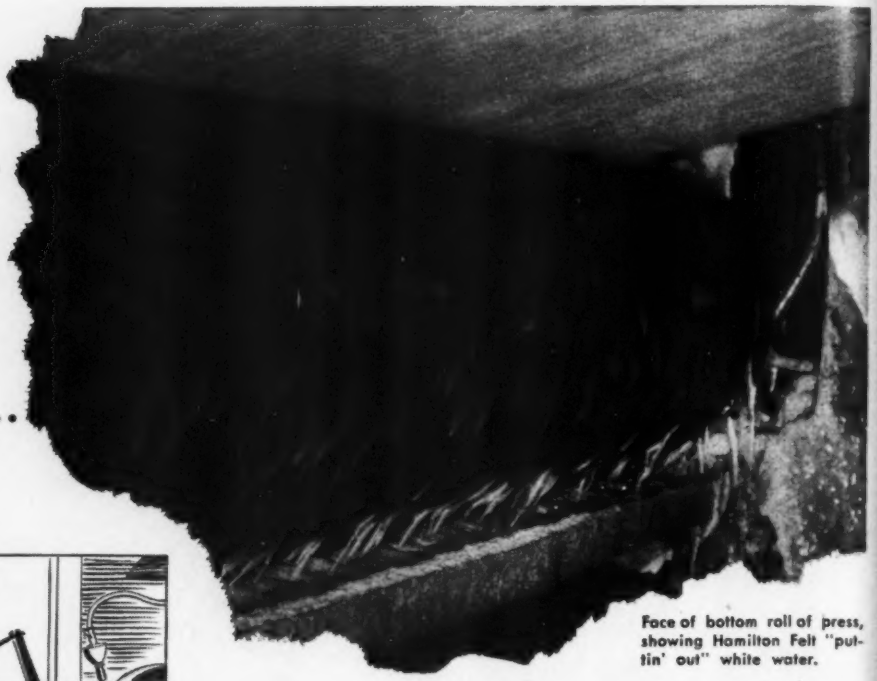
Another result of Hercules continuing research in paper-making chemicals and their application, this development is described fully in a technical paper, "Casein Adhesives in Roll-Coating." Send for your copy.

HERCULES POWDER COMPANY
INCORPORATED
961 KING STREET, WILMINGTON, DELAWARE

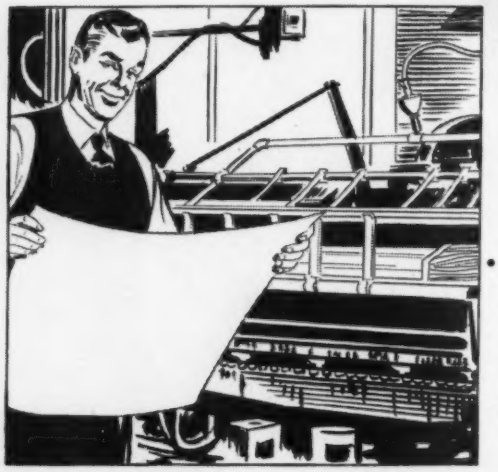
SIZING MATERIALS AND CHEMICALS FOR PAPER

PP514

First... the squeeze



Face of bottom roll of press, showing Hamilton Felt "puttin' out" white water.



then... the kiss

Manufacturers of fine papers have two purposes in mind when selecting felts. First—to remove every possible drop of water by the *squeeze* at the press. Second—to give the sheets a uniform finish that will take a clean-cut impression from a mere *kiss* of the printer's type.

It is natural that Hamilton Felts should be standard equipment in leading fine paper mills. For 93 years, patient craftsmen have labored to make Hamiltons the best felts possible. Three generations of management and labor have been born and trained in the Hamilton tradition. Their sense of responsibility extends all the way from the *squeeze* to the *kiss*.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

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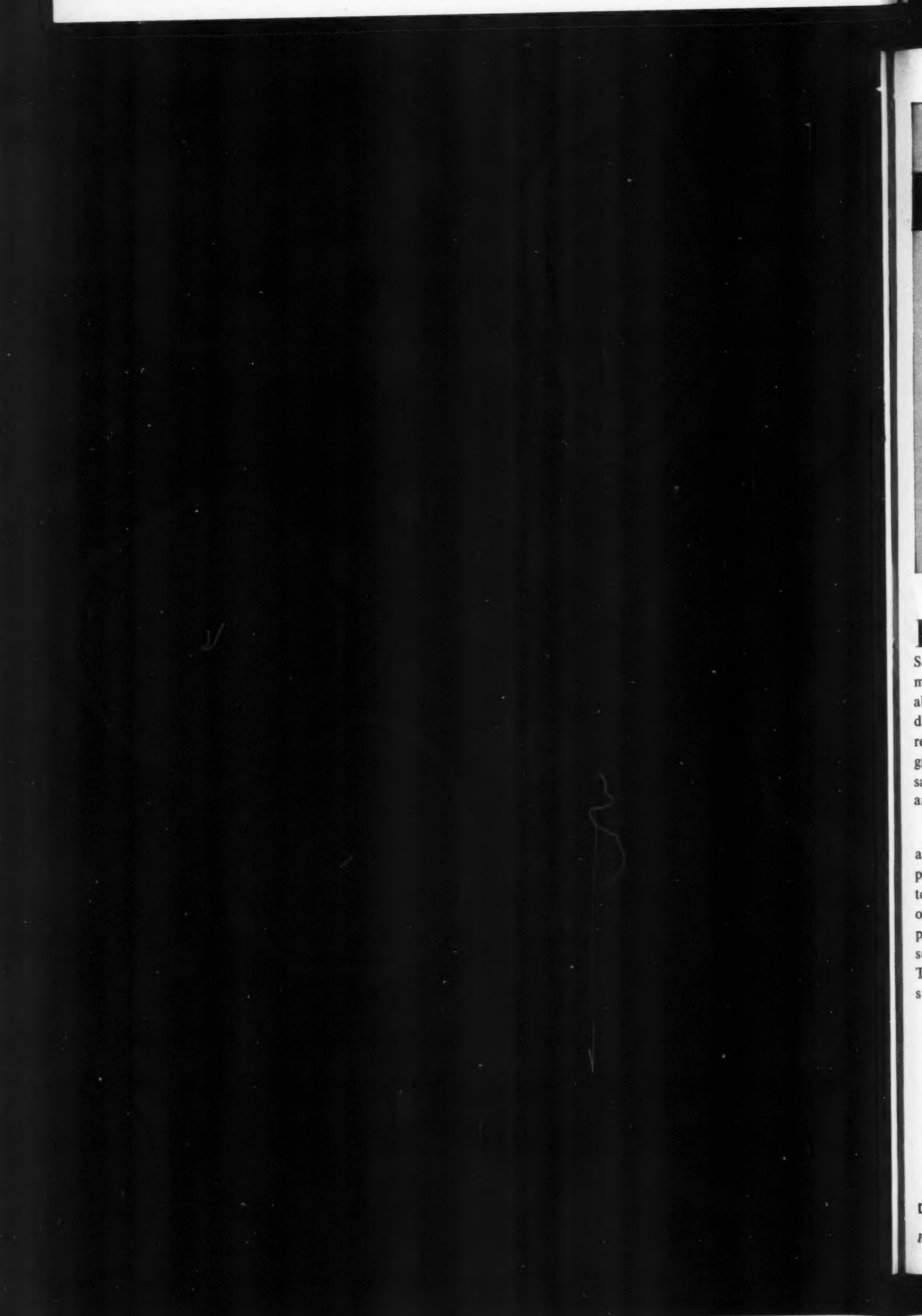
, 1951



Inches of vacuum into

feet of production

DOWNINGTOWN SUCTION ME
WATER REMOVAL INCREASES MA
SPEED...PROLONGS FELT LIFE...
IMPROVES PRODUCT QUALITY.

Intelligent placing of Downingtown Suction Rolls in paper and board machines results in the advantages above *without* additional power on the drives. The cost of the additional power required by the vacuum pump is negligible when compared with the ultimate savings in production costs and maintenance and improvement of product quality.

Downingtown, a pioneer in the development and application of suction rolls, has long played an important part in converting paper mills to this modern method of water removal. Whether one or more suction rolls will improve your mill production can be determined quickly through surveys of your plant by Downingtown Engineers. The cost of modernization and improvements are surprisingly low, the savings surprisingly high.

where **Downingtown** *Suction Rolls* prove their value in paper and board machines

IN FOURDRINIERS
Suction Couch Roll

IN FORMING SECTIONS
Suction Cylinder Couch

IN CYLINDER MACHINES
Suction Drum Roll
Suction Extractor Roll

IN PRESS SECTIONS
Suction Press Roll

FOR FELT CONDITIONING
Suction Felt Roll

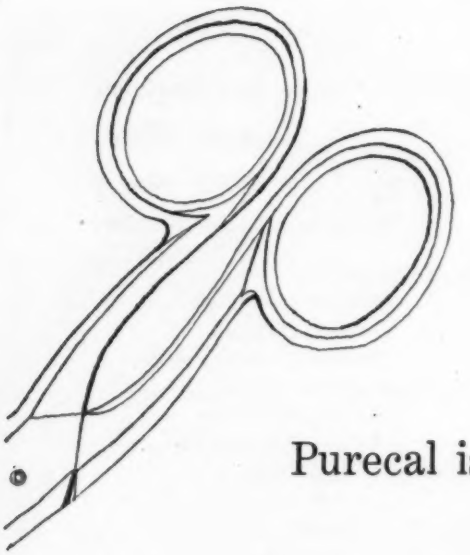
At no obligation a Downingtown Engineer will be glad to make recommendations for modernizing your machinery with Downingtown Suction Rolls. Write for complete details.

DOWNINGTOWN MANUFACTURING COMPANY, DOWNINGTOWN, PA.
Pacific Coast Representative: John V. Roslund, Pacific Bldg., Portland 4, Oregon.

DOWNINGTOWN

The Modern Method of Water Removal

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY SINCE 1880



Purecal is uniform

You'll make a more uniform product with Purecal*. Why? Because controlled precipitation assures Purecal's physical and chemical uniformity. Where water is the medium, Purecal is second to no other filler and superior to most pigments. Also, Purecal added to other pigments controls consistency, keeps paper coatings uniform in thickness.

Purecal stabilizes viscosity, reducing "down-time" on machine coating operations. Purecal allows a high degree of calendering with less loss of brightness. Yes, for pigment quality at filler cost . . . you'll want Wyandotte Purecal! Our booklet, "Adhesive Savings with Purecal," is free. Why not write for it?

*Trademark

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
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OTHER ORGANIC AND INORGANIC CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • *Offices in Principal Cities*

Wyandotte
REG. U. S. PAT. OFF.

What is pre-beating?

For years the finest Scandanavian sales grade pulps have been pre-beaten in kollergangs before being lapped or dried for shipment to paper mills. This pre-beating greatly improves the quality of pulp and, although not widely adopted in the U. S. because of the high cost, its advantages have long been recognized.

Now—the modern method

The Sutherland Pre-beating System is now accomplishing pre-beating with modern, high-capacity units so that its benefits are within the reach of every pulp mill.

with 3 big advantages to . . .

Pulp Mills

1. **A wide variety of grades and qualities can be made from one standard cook by varying pre-beating *only*.**
2. **Pulps find a wider acceptance in non-integrated paper mills.**
3. **Individual requirements of customers can be met without excessive costs.**

Paper Mills

1. **Lower power consumption.**
2. **Ability to use a much higher percentage of Southern and Western pulps.**
3. **Pulps can be tailored to fit individual paper mill conditions.**

If you're a producer or user of sales grade pulps, we know you'll be interested in pre-beating with Sutherlands. Write today for details.

SUTHERLAND Refiner Corporation

Trenton 6, N. J.

PERKINS HOLYOKE ®

Perkins Calender Rolls—the natural result of the longest and broadest experience in the industry—give quality that is definitely reflected in your product. Perkins service includes refills of any make of calender rolls.

B. F. PERKINS & SON, Inc.

HOLYOKE, MASS., U.S.A.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

You can't install a *better* valve than a

POWELL VALVE

—there IS no better!

Over a century of concentration on making one—and only one—kind of equipment must have a definite result. With Powell, the result is not only an amazingly complete* line of valves for industry but also the *best* valves it is possible to make.

*Powell Valves for the Paper Industry include not only a complete line of standard valves of all types but also special designs to meet the latest requirements of the modern paper mill.

Quality fine throughout "The Line"

Fig. 1893. A large 125-pound Alloy Cast Iron Gate Valve with special Corrosion-resisting trim. Designed especially for Sulphate Process services: causticizing, lime recovery, sulphate pulp preparation and paper mill recovery.

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

GARLOCK MECHANICAL SEALS FOR *Rotary Shafts*

Where leakless operation of rotary shafts on pumps or other equipment is required, GARLOCK MECHANICAL SEALS will do the job.

There is no wear on the shaft when a Garlock seal is used. Sealing is effected by leakless and positive contact between carefully lapped metal-to-carbon or metal-to-metal mating surfaces. One of these elements rotates with the shaft and the other is stationary. The stationary element does not contact the shaft.

These precision-built seals are made in several standard designs and in a wide range of highest grade materials. The selection of design and materials depends upon the service in which the seal is to be used. If none of our standard designs appears entirely suitable for any specific application, a modification of a standard design or a specially designed seal will be engineered and built for that job.

Thousands of GARLOCK MECHANICAL SEALS have proved their effectiveness, durability and economy on shafts operating at high and low speeds and pressures. Users of Garlock seals are enjoying many months—or years—of trouble-free operation on equipment handling various liquids such as, for example, water, gasoline, beer, acids and paint.

If you need Mechanical Seals for any kind of a rotary shaft application, let Garlock's experienced engineering staff work with you. Write for our Mechanical Seal booklet.

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PALMYRA, NEW YORK

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GARLOCK

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1951

Two Steps

TOWARD [illegible] CROP UTILIZATION

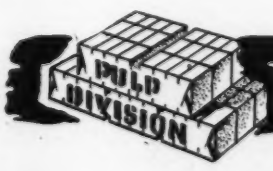
PRE-LOGGING which harvest[s] trees for use before th[ey] damaged by the big log [harvest]

RE-LOGGING which salvages much useable wood after the big log harvest.

Pre-logging and re-logging are two Weyerhaeuser forestry practices that produce wood now useable in both the Weyerhaeuser sulphite and sulphate pulp mills. Logs as small as 4" in diameter and 8' in length are now handled by a recently developed small log hydraulic stream barker.

This means that the two sulphite pulp mills are producing pulp from logs of all sizes . . . the smaller ones supplied by pre-logging, which utilizes small trees that would otherwise be completely destroyed and wasted when larger trees are felled. The new sulphate pulp mill located adjacent to the lumber mill at Longview, produces its bleached kraft pulp from pre-logging operations, edgings and slabs from the Douglas Fir Saw-Mill . . . also from re-logging operations which follow the harvesting of the mature timber.

These advanced logging and whole crop utilization practices have made possible the economical operation of the Weyerhaeuser mills and greatly increased the pulp production from a given stand of timber.

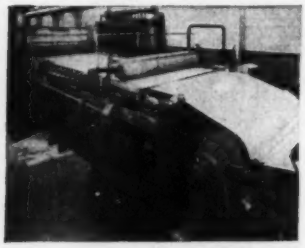


WEYERHAEUSER

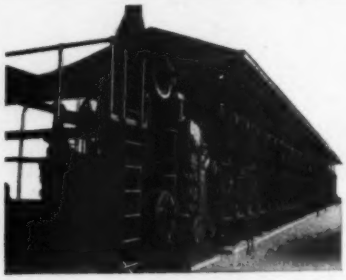
THE SANDY HILL IRON & BRASS WORKS

Builders of Paper Machines and Accessories to Meet Every Production Need

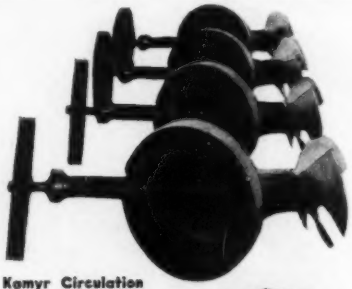
HUDSON FALLS, N. Y.



Sandy Hill Fourdrinier



Sandy Hill Dryer Section



Kamyr Circulation Pumps—Type CT

THE SANDY HILL LINE

- Adjustable Cylinder Mould Vat
- Cylinder Paper and Board Machines
- Continuous Pocket Pulp Grinders, Kamyr Patent
- Dandy Roll Drive
- Gray Iron, Semi-Steel, Brass, Ductile and Aluminum Castings
- Neilson Adjustable Lip Slice
- High Capacity Cylinder Machine
- "Selective" Paper Machine Drives
- Hypoid Gear Corner Drives
- New Design Fourdrinier Paper Machine
- "Packer" Screens with Roller Shoe Drive and Non-corrosive Vats, Frames and Flow Boxes
- Pulpers or Kneaders, Voith
- Pressure or Vacuum Type Thickener and Washer, Kamyr Patent
- Quick Opening Gate Valves
- Rotary Suction Boxes, Kamyr Patent
- Rubber, Iron, Steel, Brass, Wood and Aluminum Rolls
- Sandy Hill Bertrams Flow Control Unit
- Sandy Hill Shake, Bertrams Patent
- Shaker Pulp and Paper Screen
- Slitting and Winding Machines
- Pulp Bleaching Equipment, Kamyr Patent
- Winder Shafts—Split
- Yankee Fourdrinier Paper Machines
- Scofield Felt Conditioning Specialties
- Bag Machines
- "Tail End" Printer
- Pre-Printer

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The NEW Edition of the
SANDY HILL BROCHURE
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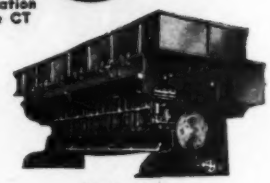
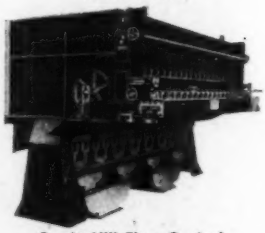
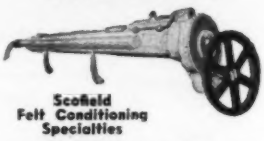


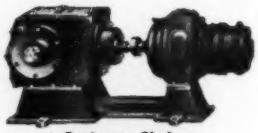
Packer Screen



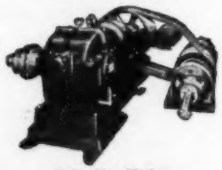
Sandy Hill Flow Control Unit and Neilson Slice



Scofield Felt Conditioning Specialties

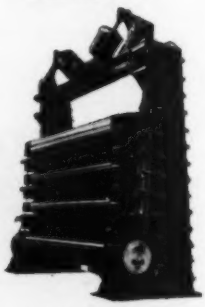


Bertrams Shake



Selective Drive

Kamyr Vacuum Washer



Calender Stack

Sandy Hill IRON & BRASS WORKS

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When the Jenkins brothers were satisfied they had made the best valve money could buy, they *signed* it with their name. Today, as for over three quarters of a century, that signature — forming, with the famous Diamond, the Jenkins trade mark — is more than a symbol of the maker's pride in his craftsmanship. It is the mark of a friend you can trust.

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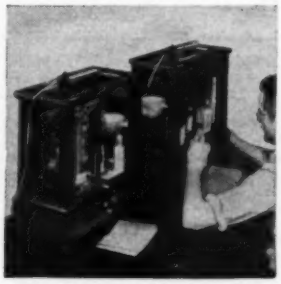
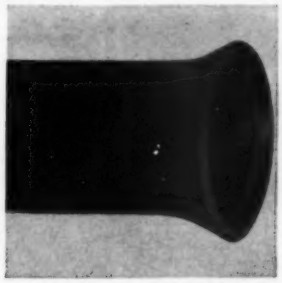
Specifications for 3½% and 5% nickel tubes are available to you with no obligation.

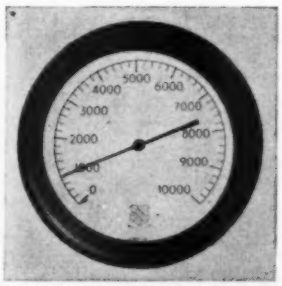


Special chemical composition test of each lot is made on your request.

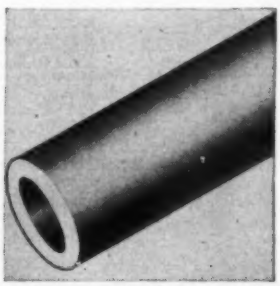


In flaring test, tube I.D. must expand 20% without cracking or showing flaws.

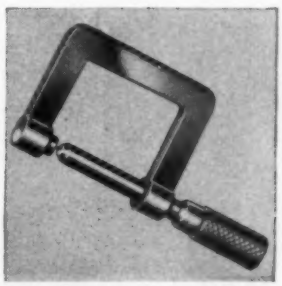
Tubes must have Rockwell hardness number not exceeding B89.



Each tube tested under hydrostatic pressure of 1,000 p.s.i. before shipment.



Tubes must be free from defects and have workmanlike finish. Inspection is rigid.



Tolerances in O.D., wall thickness, cut length are held to minimum.

Purchaser has free entry to plant for inspection of work on contract.

NOW you can be *sure* of getting maximum life per dollar invested from your black liquor evaporator tubes—before they're even installed! You can get published specifications for 3½% and 5% nickel tubes from the Timken Company that show you in advance what you'll receive. It covers every essential point, including chemical composition, physical properties, tests and tolerances.

And the Timken Company guarantees that every lot of 3½% or 5% nickel tubes will meet those specifications, by putting the tubes through many rigid tests and inspections before shipment.

That's why pulp mills using evaporator tubes made of Timken® fine alloy steel are able to report lower tube replacement costs, less tube sheet wear, reduced downtime. Send now for a copy of our specifications for 3½% and 5% nickel tubes. No charge or obligation. Write on your company letterhead to The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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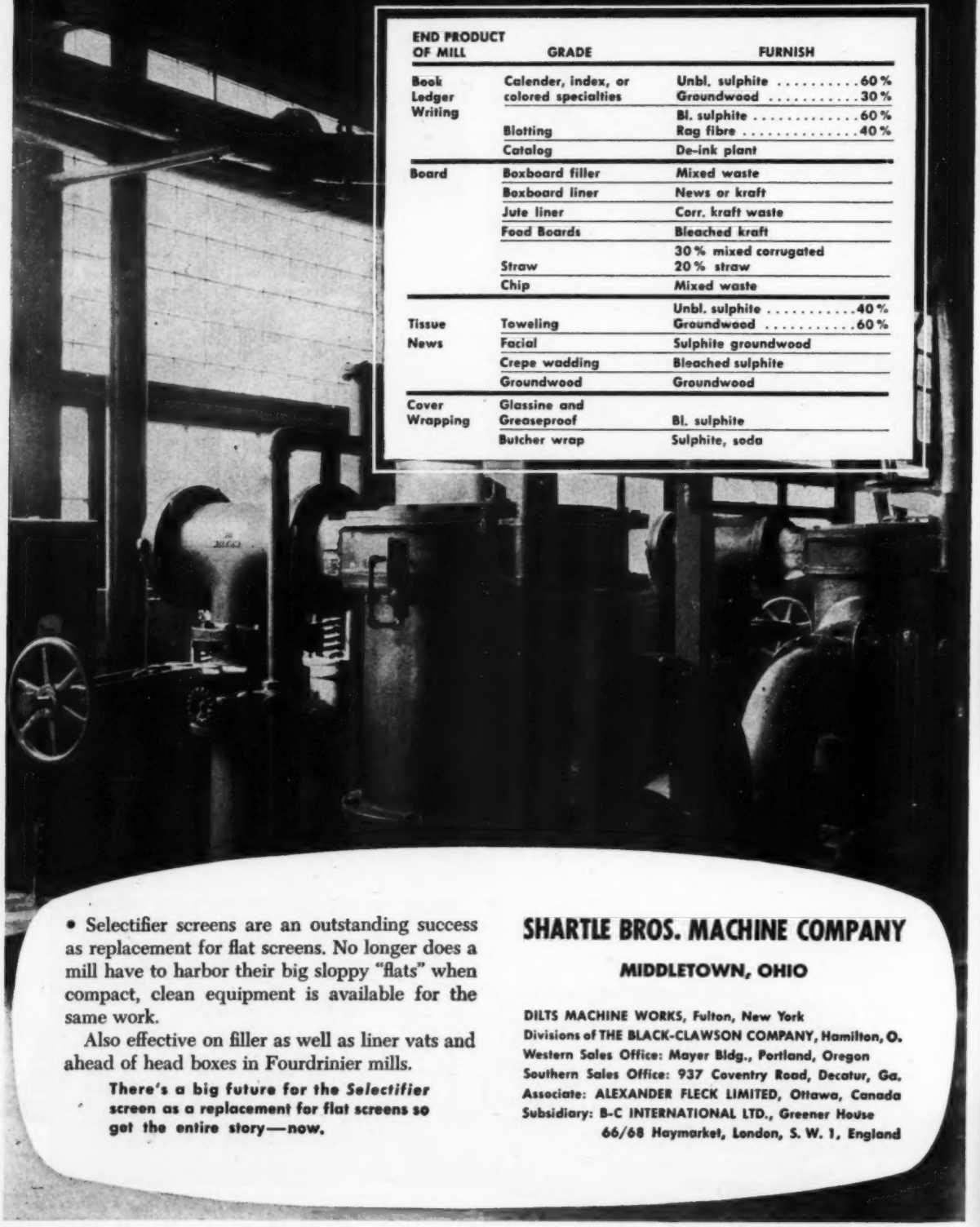
Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

Selectifier screens replacing flats



END PRODUCT OF MILL	GRADE	FURNISH
Book Ledger Writing	Calender, index, or colored specialties	Unbl. sulphite .....60% Groundwood 30%
	Blotting	Bl. sulphite .....60% Rag fibre 40%
	Catalog	De-ink plant
Board	Boxboard filler	Mixed waste
	Boxboard liner	News or kraft
	Jute liner	Corr. kraft waste
	Food Boards	Bleached kraft
	Straw	30% mixed corrugated 20% straw
	Chip	Mixed waste
Tissue News	Toweling	Unbl. sulphite .....40% Groundwood 60%
	Facial	Sulphite groundwood
	Crepe wadding	Bleached sulphite
	Groundwood	Groundwood
Cover Wrapping	Glassine and Greaseproof	Bl. sulphite
	Butcher wrap	Sulphite, soda

• Selectifier screens are an outstanding success as replacement for flat screens. No longer does a mill have to harbor their big sloppy "flats" when compact, clean equipment is available for the same work.

Also effective on filler as well as liner vats and ahead of head boxes in Fourdrinier mills.

There's a big future for the *Selectifier* screen as a replacement for flat screens so get the entire story—now.

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Quality is the reason for this performance. And quality is the reason that Gilsonite *Insul-Mastic* is used in so many industries where corrosion problems exist—no matter how severe or how ordinary.

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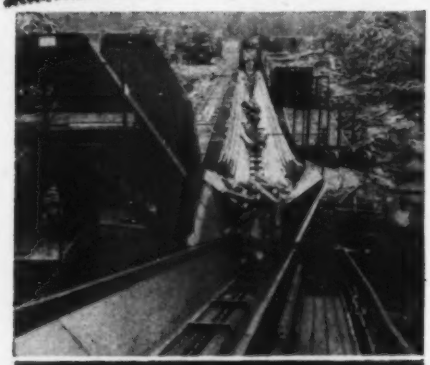
Maximum wear resistance and the *ultimate* in *shock resistance* are built-in features of all Rex Pulp Mill Chains. These quality chains are designed for dependability . . . for long-lasting service under every type of operating condition. Right through the mill, there's a Rex Chain that's right for every operation from log haul to the digesters.

With standard Rex Chains, you can forget about production hold-ups due to drive or conveyor failures. Rex Chains keep going under loads and operating conditions where ordinary chains would quickly fail.

For complete information and selection assistance, call your Rex Field Office or write direct to Chain Belt Company, 1714 West Bruce Street, Milwaukee 4, Wis., for your copy of Catalog 48-27.

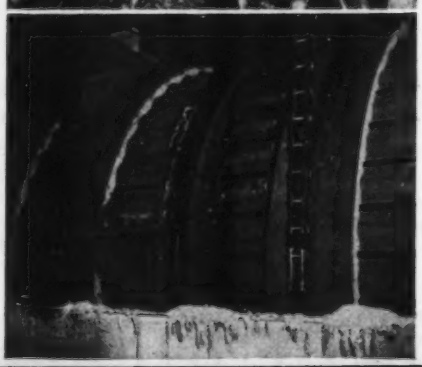
(49-106)



This wood yard conveyor uses husky Rex Mill Refuse and Log Chains. Designed with alternating cast block links and steel side bar links, these chains provide a large sliding surface and maximum bearing area.

Rex H-Type Conveyor Chains are used in this refuse conveyor. Operating in shallow troughs, these chains with their great width assure large capacity at low speeds. Wide wearing shoes, reinforced barrel faces and vertical lugs on the side bars provide extra wear resistance.

One of the most popular chains in the wood room is husky Rex Combination. Inside block links of malleable iron or Rex Z-Metal and high carbon steel side bars assure plenty of wear-resistance. Chain links can be turned over when wear does take place, assuring double life.



Plenty of drive for the barking drum is assured by sturdy Rex Chabelco Steel Chain. Combining relatively light weight with high strength, it withstands the severe vibration and shocks . . . lasts longer.

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Years of research, years of successful field experience with users of BECCO processes and BECCO Peroxygen chemicals . . . laboratory and pilot plant facilities at our plant in Buffalo . . . make BECCO a leader in the field of pulp bleaching.

Important to you . . . the active cooperation of BECCO representatives . . . specialists in pulp bleaching processes. Let us know if they can be of help.

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Among users of BECCO Peroxygen Chemicals and BECCO bleaching processes are: St. Regis Paper Co., Escanaba Paper Co., Diamond Match Co., Blandin Paper Co., Finch, Pruyn & Co., Inc., Westminster Paper Co., Ltd.

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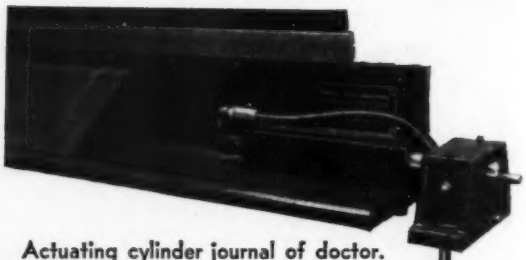
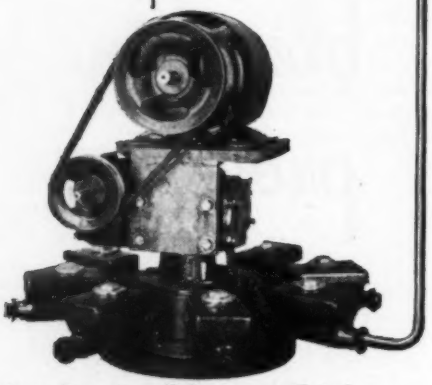
universally applicable—oscillates any doctor on any roll. Space consideration no problem since oscillator occupies no more space than the doctor journal itself. One hydraulic line from each doctor to a master unit which can be located anywhere. One master unit can be used to oscillate as many as eight doctors.



Actuating cylinder journal of doctor.
Note small space requirement.

The Lodding system offers low initial cost, low installation cost, low maintenance cost. This, plus the fact that it will fit anywhere a doctor will fit, including a great many places where oscillation has long been thought impossible, makes the Lodding Hydraulic Oscillating System the complete answer to the doctor oscillating problem.



Master unit serving all doctors oscillated.
No valves—no circulating system.

Lodding Engineering Corporation, Worcester, Mass.
Represented by W. E. Greene Corporation,
Woolworth Building, New York.

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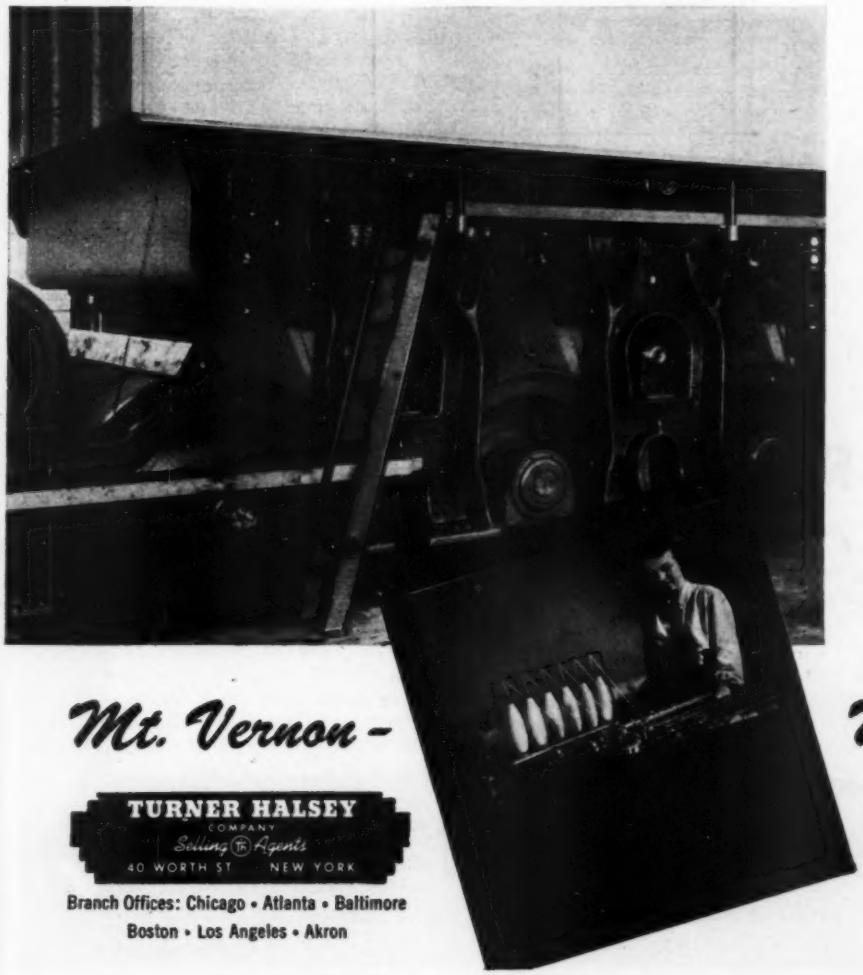
DRYER FELTS

Gives You Scientific Construction



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The Paper Industry

February 1951

Report on Canada's Pulp and Paper Industry

ONE OF THE HIGHLIGHTS of the annual CPPA meeting held last month in Montreal was the report of its president, R. M. Fowler. His message touched on many phases of his country's leading industry. Because Canada is our nearest neighbor, and because its pulp and paper industry is so closely related to our own, we have taken excerpts from his report that throw some light on the status of this industry and the attitude of some of its leaders.

Newsprint prices . . . In November, 1946, price controls were removed in the United States for all but a handful of commodities. At that time the price of newsprint for delivery in New York was $84 per ton. Today it is $106 per ton, an increase in over four years of 26 per cent. . . . While Canadian newsprint prices were increasing 26 per cent, the general wholesale price index rose by 56 per cent; the general building materials index was up 64 per cent; the index of industrial materials increased 81 per cent; and the retail cost of living was up over 34 per cent.

. . . In examining price indexes for industrial commodity groups and for specific commodities it was found that in practically every case the percentage of increase in price levels since December, 1946, is much greater than the 26 per cent for newsprint. Here are a few examples: coal prices in Canada are 31 per cent higher, with U.S. anthracite 53 per cent higher; pig iron and steel billets are up 66 per cent, and the scrap iron and steel group is 82 per cent higher; domestic zinc and lead are higher by 230 per cent and 254 per cent respectively; tin ingots are up 132 per cent and electrolytic copper 122 per cent; raw wool is higher by 207 per cent.

Growth of the industry . . . Since the war, ten new pulp and paper mills, using annually more than 1,250,000 cords of pulpwood, have been brought into operation, and at least one large additional mill is under construction. Over the past few years an interesting change has been taking place in the structure of the Canadian pulp and paper industry. Throughout the decade of the thirties, newsprint represented about 66 per cent of total pulp and paper tonnage, other papers were 12 to 13 per cent, and market pulps about 21 per cent. In the last five years, newsprint's percentage of total tonnage has fallen to less than 58 per cent, with other papers accounting for 17 per cent and market pulps 25 per cent of total Canadian production. . . .

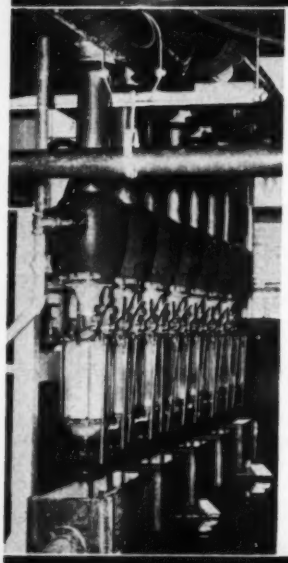
. . . Figures for 1950 are not yet available, but in 1949, there were over 52,000 people employed by the industry in the mills alone. The total wage and salary bill rose from $80,000,000 in 1945 to nearly $158,000,000 in 1949; the average wage paid increased from $1,873 in 1945 to $2,852 in 1949. For the average wage earner, between 1945 and 1949, the payment for his labor rose 52 per cent while the Canadian cost of living was going up 34½ per cent.

Problems . . . For example, there is a sulphur shortage, and sulphur is essential for the manufacture of most kinds of chemical pulp. Suppliers of sulphur in the United States have cut their shipments to Canadian mills by 20 per cent, and great efforts will be needed to develop alternative supplies before production suffers. Steel for construction and machines with a large steel content are already difficult to obtain because of defense priorities. Transportation facilities in Canada are already taxed, and with the added burden of defense production, we are likely to have an almost permanent shortage of boxcars. Labor shortages—particularly in the woods—are beginning to appear; and when the defense program expands, we are likely to have a serious problem in this industry to hold labor in remote communities and woods camps throughout the forest area.

Attitude toward government controls . . . One of the most curious phenomena of recent weeks has been the way businessmen, who have for years been extolling the virtues of free enterprise and protesting against interference by governments, have begun to clamor for economic controls. At least they seem to have thrown up their hands and to regard government controls over production, distribution, and prices as inevitable. It is true, I think, that this attitude is more apparent in the United States than in Canada. It is also true that many businessmen and labor leaders would like to see controls imposed on others and not on themselves.

No doubt, there are some commodities where the sudden impact of defense production will require some measure of government control to insure effective and speedy mobilization. But for the pulp and paper industry, . . . where war and defense production does not change the essential nature of the job it has to do, I refuse to believe that we need to get into the whole elaborate paraphernalia of rationing, quotas, advisory committees, administrators, price ceilings, and policing. Surely, for such a shortage, this industry should be able to avoid rushing into a strait-jacket. It will require much co-operation, great tolerance, considerable courage, and possibly the taking of some risks of loss. It will be harder to work out the problems for ourselves than to have some administrator armed with government authority tell us what to do. . . .

. . . Perhaps this almost automatic turning to government controls in the present emergency is only part of a more general attitude of mind on this continent at the moment. We seem to be obsessed with danger and forget that we make up the strongest and most vigorous area in the world. We are thinking only in terms of survival and forget that in human affairs to concentrate on survival is an almost sure way not to survive. . . . Can we not concentrate on our opportunity, not only to keep what we have, but to bring advantages of security, economic development, and freedom to millions of dispirited and hopeless people throughout the world?



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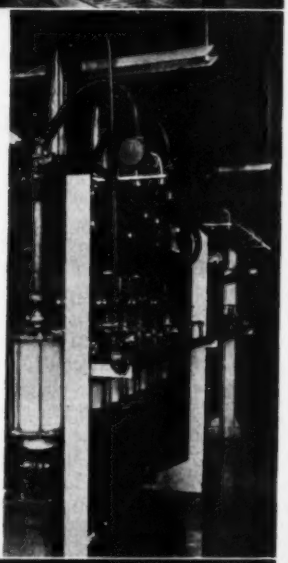
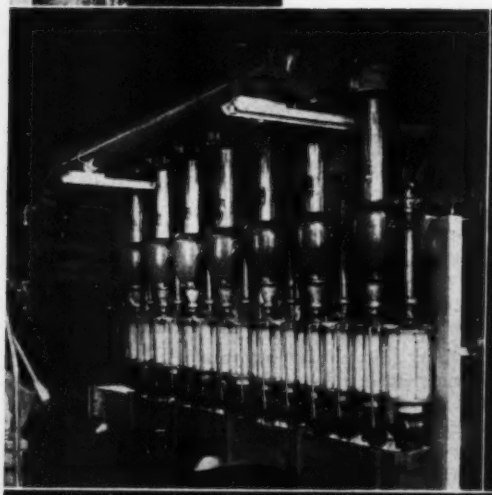
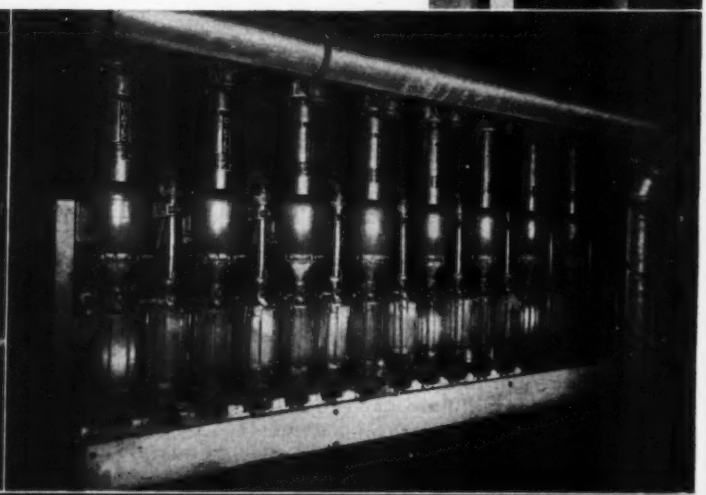






BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Record paper production in 1950

FLASH! . . . As this form is released the Government announces its anticipated control order: *Most commodities and services are frozen at top levels reached between December 19 and January 25; also most wages and salaries are frozen at January 25 rates.* This price-wage order is called a "stop-gap" . . . it affords more time for parley. All price controls apply beyond the raw material stage.

AN ASTOUNDING RECORD of production of paper and paperboard was achieved in 1950, when output was more than 3,000,000 ton in excess of the output in 1949. Although complete figures are not yet available for the year (December statistics being incomplete), it is certain that the 1950 total will be between 23,500,000 and 24,000,000 tons. October and November output was so heavy that if either month had been an average for the year, the 1950 production would have been 26,500,000 tons.

This is still more startling when compared with theoretical capacity. Capacity figures are based on 310 days of twenty-four hours of output, and on this basis the capacity is slightly under 24,500,000 tons per year. On a seven-day-week basis, maximum production would be 117 per cent of the rated capacity. In fact the actual operation during the year was at well over 100 per cent, and October and November output was at a rate of 108.5 per cent of rated capacity.

Yet with all this production, and no indication of excess inventories on hand in the distributing and consuming fields, the mills are almost universally some eight weeks behind in deliveries.

In the face of a record-breaking demand—for that is the chief reason for the startling production records—prices have not risen in proportion to the general level of consumer commodities. Increases have been economically inevitable, but not to an unwarranted degree.

This situation and the expansion of a defense program has forced Washington recognition of the part which paper plays in the national economic picture. What may be decided is beyond the ken of the man in the street. There are no threats of price rollbacks as yet, and there is serious question whether any rollbacks would be justified in view of the complex pulp situation. Many grades of paper are now selling at less than the going price for the pulp of which they are made, the paper men selling their converted product on the basis of the prices for pulp at the time of pulp purchases. To roll back the prices of paper without a comparable rollback in pulp prices would be unjust, yet if domestic pulp prices were to be rolled back, no ruling could apply to the huge volume of imported pulp. If any attempt were made to apply a price fix to imported pulp, foreign producers could find a market for their output in other countries and there just would not be imported pulp to maintain paper production to meet current demand.

This is the problem which is facing the Washington defense production agencies. It is the reason why every paper mill in the country was recently requested by telegram from the Economic Stabilization Agency to notify that agency seven days in advance of any contemplated price advance. This request was merely for information as to price plans, and in no sense an order to maintain prices. The implication, however, was clear that price advances, if too extreme or general, might cause the issuance of price regulations.

A comparable development was the issuance of orders by the National Production Authority forbidding the hoarding of a long list of commodities, and paper and paperboard were included in this order.

Eric Johnson becomes ESA administrator

It is being repeatedly stated by those with close Washington contacts that the public, including industry, is far ahead of Washington in sentiment for out-and-out defense mobilization. This was recognized at Washington also, when Dr. Alan Valentine, previously recruited from his position as President of the University of Rochester, was incontinently dismissed from his position as Economic Stabilization Administrator and replaced by Eric Johnson, President of the Motion Picture Industry, former President of the United States Chamber of Commerce.

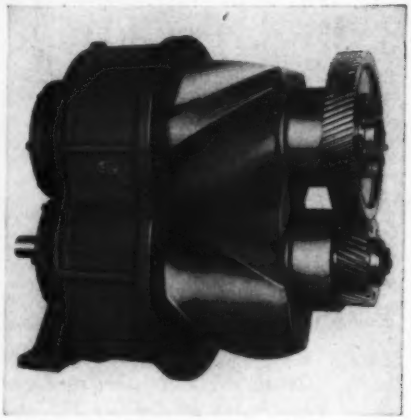
The admitted reason for the change was that Dr. Valentine had been too slow in setting up controls and in establishing a staff to permit adequate control functioning. Mr. Johnson will be given greater power than was formerly conferred on Dr. Valentine. Back of this shift was an admitted conflict involving Charles E. Wilson, Defense Mobilization Director, who came from the presidency of General Electric to take the top mobilization job, and also Michael V. DiSalle, Price Stabilization Director, who was demanding speed in setting up adequate controls. In the new picture, which is expected to be spelled out in an Executive Order before this survey appears in print, Mr. Johnson will have power to formulate policies on control of wages, prices, credit, rents, profits, rationing and subsidies as well as related matters. Under his supervision would be Mr. DiSalle in charge of price stabilization and Cyrus S. Ching, Wage Stabilization Director.

In the background is the hesitancy on the part of the Administration to put a curb on wages, yet without wage stabilization it is impossible to fix adequate price controls. The terms of the Defense Act specifically provide for wage stabilization in any industry where price controls are established.

This summary, though changing as it does from day to day, indicates that

STANDARDAIRE

Precision Built Axial Flow



BLOWERS handle the movement of air gently by screw action instead of paddle action, as is the case with other positive displacement blowers. Result—air pulsations and noise are reduced to a surprisingly low level. In Standardaire Blowers the revolutionary new form of the rotors marks a major improvement in blower design. The rotors are produced by an exclusive rotary generating process, the form and helix being controlled entirely by the machine gears. This produces rotor threads that are accurately shaped and machined to close tolerances for efficient blower operation. The design of the rotors and other construction details makes possible internal compression to a degree that Standardaire Blowers operate on a modified adiabatic cycle with a lower mean internal pressure. This important feature, together with advanced engineering throughout, makes for a quiet, compact, efficient blower with long service life.

Write for Standardaire Blower Bulletin covering dimensional information. Publication No. 88.

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the Washington kaleidoscope is still giving out a different colored picture periodically. Whether wage and price controls come before this survey is in print or not, strict price controls are in the making and will come soon, if not immediately. One difficulty is that adequate staffs have not yet been established to enforce control orders which may be issued. Men are being secured as rapidly as they can be released from their present industrial connections. This is the case with the paper industry. Without any effort to segregate or chart their functions, some instances can be named. Rufus Worrell of The Mead Corporation has been retained by the ESA as a consultant until that agency can formulate an organizational setup. The War Munitions Board has asked for an industry man to serve for a short time as consultant to analyze conditions in the paper industry and point out where shortages may occur. Indications for an intelligent appraisal of paper problems in the procurement picture have grown with the willingness of agency heads to secure experienced paper men for the key positions where their experience will prevent issuance of impracticable orders.

Meanwhile in some cases outstanding business men will be utilized on a non-pay basis to assist in the formulation of efficient practices.

Problems of an adequate supply of sulphur, and recognition of paper mill wire requirements, if production is to continue unimpaired, are subjects of continuing discussions with control agencies.

Outside the Washington field, but bearing on the raw material situation, is an effort to salvage a billion or more board feet of tornado felled pulpwood in the Adirondack Forest Reserve of New York. Present law forbids the removal of even dead or down timber from this area. Legislation is proposed at Albany to rectify this situation and utilize this vast amount of raw material instead of leaving it untouched. Advocates of the proposal say it is a true conservation movement, and not one to destroy the recreation or aesthetic value of the forest area.

Financial

Paper mill securities continued to move upward in the stock exchanges during January, reaching in many cases the highest prices in history. For the first time in history Wall Street houses are beginning to advise their customers to consider investment in this industry.

West Virginia Pulp & Paper Co.—Net income for the year ended Oct. 31 was $12,262,000 as against $10,842,169 for the previous fiscal year.

Rising Paper Co.—Net earnings for the fiscal year ended Oct. 29 were $216,161 as

compared with a loss of $25,224 in the previous fiscal year.

Paper Mill Corporate Changes

Sweet Brothers Paper Mfg. Co.—Control of this more than sixty year old company has been sold to the Green View Tissue Corp. of New York, but the present management will remain in charge of production. The sale is a result of the Green View program for securing a steady source of supply for its converting operations which may eventually be centered at the Sweet mill location in Phoenix, N.Y.

Kupfer Bros. Co.—The extensive paper converting plant at Northbridge, Mass., has been acquired by the Frank Schulman Paper Corp., New York, which is already a large distributor of the wide variety of papers and specialties produced by the Kupfer plant. No changes in the distribution of Kupfer products through its present sales agencies is contemplated in the immediate future.

Collins Mfg. Co.—A reorganization of the old North Wilbraham, Mass., company is resulting in the formation of two new companies. Boston capital is involved in the development under which one corporation, Cellulose Products, Inc., will make cotton pulp and cotton content papers, as well as other cellulose products. Holyoke Pulp & Paper Corp. will deink waste paper for the production of bleached pulp for resale.

Robert Gair Co.—A refinancing enterprise has been concluded under which the company is retiring about $9,000,000 in notes by payment of $3,000,000 in cash and the sale of $7,000,000 in 3⅞ per cent bonds of a subsidiary, Southern Paperboard Co., to a New York insurance company.

New York Stock Exchange—Stocks

(Closing Prices)	Jan. 20, 1951	Dec. 20, 1950
A.P.W. Products	7¼	7
Celotex	16⅝	14⅝
Same Preferred	160⅜	157½
Certain-teed Products	15⅝	14
Champion P & F. Co.	49¼	47
Same Preferred	104	106
Chesapeake Corp.	35	28⅜
Continental Diamond	13½	12⅛
Container Corp.	33½	31⅝
Same Preferred	105½	103⅝
Crown Zellerbach	50½	45⅞
Same Preferred	105¼	103¾
Dixie Vortex	46	44⅜
Same "A"	51¼	* 52–53
Eastern Corp.	21⅝	19½
Robert Gair	9⅝	12¼
Same Preferred	19⅞	* 18–18½
Gaylord Container	24¼	23⅞
International Paper	54	50⅛
Same Preferred	108⅜	*107–110
Kimberly-Clark	44⅝	46
McAndrews & Forbes	39¼	40
Marathon	37⅛	34¼
Masonite (new)	32	00
Mead Corp.	25⅞	22⅝
Same Preferred	94½	93½
Same 2nd Preferred	64	54⅜
National Container	12¼	11
Rayonier, Inc.	50	49
Same Preferred	36⅝	* 35¼–35½
Scott Paper	43¾	44
Same $3.40 Preferred	101	* 98–99
Same $4.00 Preferred		*106–107
St. Regis	13¾	11⅝
Same Preferred	95⅝	* 93–95
Sutherland Paper	49	* 43–44
Same Preferred	119½	*113–114½
Union Bag & Paper Co.	43¾	37¾
United Board & Carton	18	17
United Wall Paper	3⅜	2⅜
Same Preferred	25½	* 22¼–23½
U. S. Gypsum	107⅜	99½
Same Preferred	183¼	184
West Va. P. & P. Co.	81¾	72⅛
Same Preferred	110½	*109–109⅞

New York Stock Exchange—Bonds

(Closing Prices)	Jan. 20, 1951	Dec. 20, 1950
A.P.W. Products 3⅝	85	.....
Celotex 3¼%	102	102
Champion P & F. Co. 3⅝	102¼	104
Mead Corp. 3⅝	107	107

New York Curb Exchange—Stocks

	Jan. 20, 1951	Dec. 20, 1950
Am. Writing	8⅝	8½
Great Northern	48¾	44½

*Closing Bid and Asked Prices.

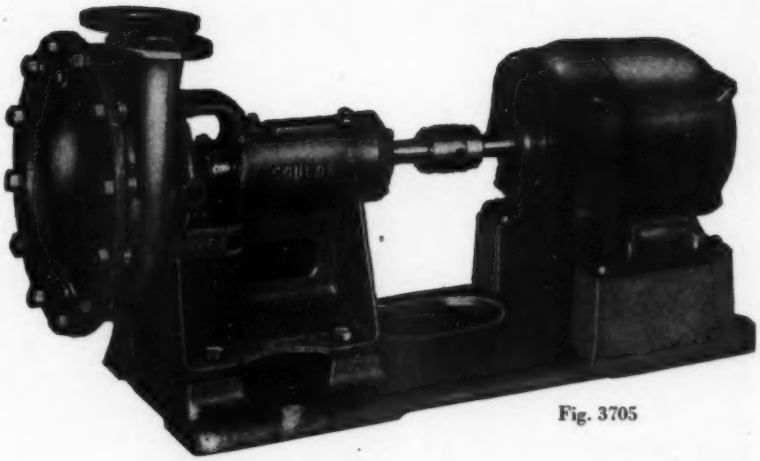


Fig. 3705

For Outstanding Service Handling Corrosive Liquids—

Goulds new stainless steel centrifugals

ADVANCED PUMP DESIGN—

The Goulds 3705 stainless line represents the last word in effective design. Fig. 3705 pumps will give you efficient, dependable, 24-hour service in handling corrosive liquids—at low cost.

CAPACITIES—

Goulds stainless steel centrifugals are made in 8 sizes with capacities to 750 G.P.M. and heads to 180 ft. depending upon capacity.

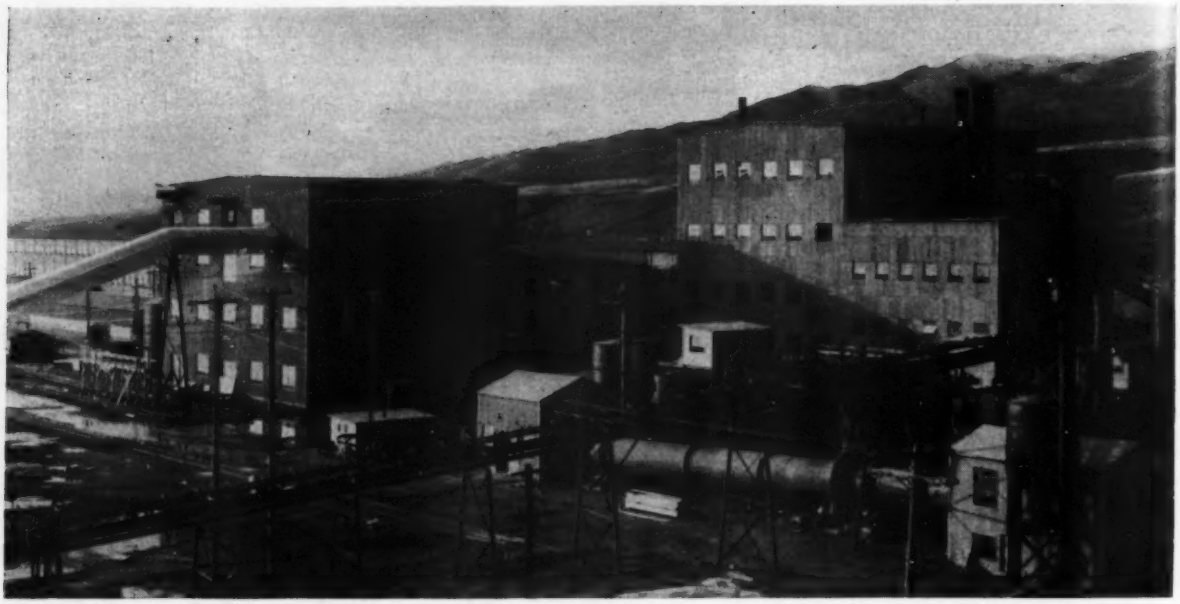
ADVANTAGES—

Exceptional efficiency (see Bulletin for performance curves) plus extreme simplicity make this an ideal pump for corrosive applications. High interchangeability of parts cuts stocking problem. Quick inspection or cleaning—simply remove casing cover without disturbing pipe connections.

Write for Bulletin 725.3 for complete details on this new stainless steel pump.

MEMBER HYDRAULIC INSTITUTE

Goulds PUMPS INC. Seneca Falls New York



NEW PULP AND PAPER MILL of Potlatch Forests, Inc., just prior to operations. Paper machine room is at extreme left background. The aluminous conveyor at left is the chip conveyor system into the digester room

Potlatch Forests, Inc., completes new mill in Idaho

Multi-million dollar plant will utilize waste wood—scrap from sawmill and culled timber

▶▶▶ IN THE HEART of the great White Pine Area of Idaho, Potlatch Forests, Inc. has placed in operation a new 150-ton bleached kraft pulp and paper mill. It is the first such mill in Idaho and is located on the plant site of the company's huge white pine sawmill in Lewiston, which has been in operation since 1927.

In October, 1949, the directors of Potlatch Forests, Inc. announced the entrance of the company into the pulp and paper field. This decision was promoted by the necessity and desire to more fully utilize the timber lands of the company. In years gone by before the development of by-products from wood wastes sawmill towns were identified by huge burners which burned the leftovers that could not be manufactured into useful lumber products. Today these burners are conspicuous by their absence.

Potlatch Forests, Inc. whose general offices are at Lewiston, Idaho have sawmills located at Potlatch, Coeur d'Alene, and Lewiston with two logging operations at Bovill and Headquarters. The company has been in operation in Idaho since 1906 at which time the sawmill at Potlatch began.

William P. Davis of Lewiston is president and general manager. Other officers are: G. F. Jewitt, Spokane, Washington, chairman of the board; E. W. Davis, St. Paul, Minnesota and F. K. Weyerhaeuser, St. Paul, vice presidents; H. L. Torsen, Lewiston, secretary-treasurer and D. D. Lyells, Lewiston, assistant secretary and assistant treasurer.

Paper mill personnel include: Roland Wilber, manager; Joe Betts, chief engineer; J. A. Williams, paper sales manager; O. B. Smith, general superintendent; Ollie Duncan, paper mill superintendent; Clyde Christensen, pulp mill superintendent; Kenneth Ross, power superintendent; Everett Wallace, electrical superintendent; Vern Young, assistant electrical superintendent and Roland Fortier, chief chemist. The new plant will employ about 250 persons, making the total employed at Lewiston about 1750.

The construction of the paper plant began February 15, 1950, and the first paper was run off the Rice-Barton paper machine December 23 of the same year. It is one of the most modern kraft mills in the United States.

One significant task the company undertook in the months preceding the actual operation was that of a complete study in co-operation with interested agencies relative to stream pollution. Shortly after the announcement that the plant was to be constructed, the company retained the services of the Institute of Paper Chemistry to make a complete biological study of the stream from which the mill receives water and into which the effluent from the plant will flow. In addition, interested agencies of local, state and federal governments were invited to send representatives for a co-operative study of the river before the plant began operation. This next summer these representatives will return to make another study of the river to determine if there are any harmful effects on the plant and fish life of the stream. This will provide a before and after picture.

Mr. Davis has appeared before the Water Resources Advisory Committee of the State of Idaho and other executives have met with other wild life groups, Chambers of Commerce, service clubs and others, explaining what the company is doing to protect the stream. In

addition, the company co-operated with the Idaho State Department of Fish and Game and the Washington Water Power Company in a fish count of the fish ladders of the dam and hydroelectric plant which forms the log pond for the sawmill. This count will be continued during 1951 to determine if there is any appreciable difference in the number of migratory fish because of the effluent from the paper mill.

Considerable remodeling of the present sawmill was necessary in conjunction with construction of the pulp and paper mill. Since the paper mill will utilize the left-overs in the sawmill the "long butts," small tops, broken logs and logs not otherwise merchantable as lumber, barkers were installed to remove the bark from all logs that entered the sawmill. The slabs, edgings and trims produced in the sawmill will be made into pulp chips.

The first run in the paper mill was the manufacture of unbleached, machine-dried pulp. This plant is very flexible in that it can produce almost any kind of bleached or unbleached paper. Present plans call for the manufacture of machine-dried pulp, bleached container board, bleached tag stock and unbleached kraft.

The entrance of the company into the pulp and paper field has been a further step in the diversification of products made from wood. It provides another product which allows the company to more nearly approach the goal of complete utilization. In addition to paper, other by-products, excluding lumber, are pres-to-logs and pres-to-logs stoker fuel, made from the dry shavings in the planing mills. Edge-glued lumber making wide panels out of narrow boards; industrial cut stock, a department which utilizes the dry leftovers developed during processing of lumber for shipment, and in 1949 a pine veneer plant began operation making thin veneers for doors, knotty pine paneling and cores and cross bands for plywood. Thus on one plant site all the above by-products are manufactured and sold.

Cellulose Fibres Changes Hands—Former Owners Set Up Two Businesses

After disposing of their holdings in Cellulose Fibres, Inc., Holyoke, Mass., Robert W. Pattison and Joseph H. Barowsky have formed two new corporations which will be located at the site of the former Collins Manufacturing Co. plant in North Wilbraham, Mass. Cellulose Fibres has been taken over by a group of Boston business men, and will be operated under the direction of Raymond Jacobson.

The two new firms which Mr. Pattison and Mr. Barowsky have formed in North Wilbraham will be known as Cellulose Pulp Products Inc. and Holyoke Pulp and Paper Corp. Mr. Pattison will be president and general manager of the cellulose firm, and Mr. Barowsky treasurer. President of the Holyoke Pulp firm is John C. Lowe, head of Lowe Paper Machinery Corp., Holyoke; Mr. Pattison will serve this organization as treasurer and general manager. The general superintendent of the two concerns will be Lucien A. Laurin, boss machine tender for American Writing Paper Corp. at its Riverside Division for many years, and assistant superintendent of AWP's Crocker Division since the recent shutdown of the Riverside plant.

Most of the papermaking equipment in the Collins plant has been leased by the new corporations. Cellulose Pulp Products will make cotton pulp and cellulose products and cotton content paper; other mill facilities will be utilized by Holyoke Pulp to deink waste paper to produce bleached pulp for resale. About 40 persons will be employed immediately by the two concerns.

St. Helens P&P Plans Extensive Modernization

A new modernization and expansion program will be completed by St. Helens Pulp and Paper Co., St. Helens, Ore., within the next two or three years if availability of equipment and materials remains at its present level.

Expenditure of $3,600,000 has been authorized by the St. Helens board of directors for improvements throughout the mill which should bring the mill's total daily capacity to 225 tons rather than the present level of 175 tons. Better quality in certain specialties now being produced will be possible, and new specialities will be added to the company's production. Utilization of raw materials will be improved, and productivity will be increased so that in periods of normal demand the mill will be in a superior competitive position.

Improvements will include additional chip making and screening capacity; an additional digester; addition of a pulp blow tank, brown stock washers and a digester heat recovery system; additional pulp screening capacity; modern multi-stage pulp bleaching plant; modern water treatment system; additional waste liquor recovery equipment; an electrostatic precipitator and additional causticizing equipment; rebuilding of No. 1 paper machine with a new drive, new wet presses and additional drying capacity; the installation of broke hydrapulpers; and an additional rewinder.

F. S. Morgan, company plant engineer, will be in charge of all engineering. Modernization should be effected without interruption of production except during the rebuilding of No. 1 machine.

Proposed Colorado mill may be changed to bleached sulphate

One more proposal for new construction of additional newsprint capacity seems to have come to naught. Plans had been formulated for the building of a mill in the Colorado region to use large quantities of dead timber, or for scientific cutting in forest areas. Latest plans are said to be for establishment of a bleached sulphate mill, with R.F.C. assistance, instead of the original plan to produce newsprint.

The Administration has given the go-ahead signal to its representatives in Congress to seek an extension of the Reciprocal Trade Agreement Act, and for legislation to modify existing tariff laws. Two bills have been introduced to effect these results. One to extend the Trade Agreement Act is expected to be cleared by the Ways and Means Committee of the House of Representatives before February 1, and hearings began on January 22. The American Paper and Pulp Association filed a brief in opposition to the extension of the measure unless amendments to eliminate inequities in the existing program are added. The other measure, the so-called Customs Simplification Bill, will come up later; this bill would modify existing provisions for fixing values for duty purposes of imported goods, to relax restrictions on foreign price-fixing.

New Kraft Pulp Mill Part of Expansion Planned by St. John Sulphite, Ltd.

A $20,000,000 expansion program is under way for St. John Sulphite Ltd., Fairville, N.B., Canada. The mill presently manufactures bleached sulphite pulp.

Innovations will include a new kraft pulp mill which will have an output of 250 tons daily; the present 130 tons per day produced at the sulphite mill will also be increased to 200 tons per day. Company officials have announced their hope to build the new plant adjacent to the present mill, but another location will have to be found if a suitable water supply is unavailable; the firm has not yet received a reply to a request made of the City of St. John for 23,000,000 gallons of water a day.

About 200 additional workers will be hired when the project is completed; annual pulpwood consumption of 110,000 cords will probably increase to 300,000 tons.

PAPER MILL MEN and state officials who attended meeting of the Michigan Water Resources Board: Left to right—Ralph Purdy, sanitary engineer, Water Resources Board; (second, unidentified); L. J. Scheid, Watervliet Paper Co.; L. F. Oeming, chief engineer, Water Resources Board; Harry Gehm, member National Council for Stream Improvement: P. H. Gideon, St. Regis Paper Co.; Russell Winget, sec'y, National Council for Stream Improvement; F. B. Curtenius, Kalamazoo Paper Co.; A. J. Palladino, res. engineer, National Council in charge treatment plant; Arthur Corcoran, Michigan Water Resources Comm.; Jack Gilman, Allied Paper Mills; John Hepler, Michigan State Health Dept.

Kalamazoo Valley mills may be ordered to build own water treatment plants

Order under consideration by State Water Resources Board would require 12 mills in the Kalamazoo River Valley to build own settling tanks similar to pilot plant now operating at Michigan Paper Company as joint project of six mills

▶▶▶ TWELVE PAPER MILLS in the Kalamazoo Valley are under orders to complete the initial phase of a planned cleanup of the Kalamazoo River by June 1, 1953.

The order came after the three-day December meeting of the Michigan Water Resources Board held in Kalamazoo. Mills affected are Allied Paper Mills, Kalamazoo Paper Co., Michigan Paper Co., Rex Paper Co., Watervliet Paper Co., Mac Sim Bar Paper Co., National Gypsum Co., Sutherland Paper Co., Otsego Falls Paper Co., Hawthorne Paper Co. and Kalamazoo Vegetable Parchment Co.

As explained by L. F. Oeming, the Commission's chief engineer, the order will require all mills to construct settling plants similar to a pilot treatment plant now in operation at the Michigan Paper Co. mill in Plainwell, Mich. The pilot plant, the joint experimental effort of six of the 12 mills, represents a combined investment of approximately $60,000 and has been in full operation for the past three months.

Under the Commission order, book, writing, specialty, and pulp mills will be limited to a maximum discharge of ten pounds of solids for each ton of white water. Board mills will be limited to five pounds per ton of white water.

Hearings on the orders are planned for March in Lansing, Mich., and mills have not indicated the course of action they plan to take at that time. During the hearings in Kalamazoo, however, mill executives indicated that they would regard any immediate Commission orders as premature. They felt that the pilot treatment plant in Plainwell should be allowed to operate for at least a year to determine its potentialities.

In a formal report, Dwight Stocker, president of Michigan Paper Co. and head of the organization formed to construct the pilot plant, asserted the belief that several details and problems remained to be solved before the pilot plant could be regarded as practical for all mills.

Disposal of the accumulated sludge is currently the chief problem, Mr. Stocker told Commission members. "For a while we can fill holes with it (the sludge) but what are we to do when the holes fill up"? he asked. Mr. Stocker went on to relate plans for harrowing sludge into submarginal land near his company's plant in an attempt toward soil improvement. But, he pointed out, this method of disposal even though successful would be available only during months when the ground is not frozen or covered with snow.

If the Commission order is upheld following hearings, maximum discharge rates will be immediately established for all mills. Milton P. Adams, executive secretary of the Commission, declared

Puseyjones Cylinder Machine with a Stream-Flow Wet End—the most modern felt machine ever built.

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If your 1951 plans call for a new Cylinder Machine or the rebuilding of an existing one, ask a Puseyjones engineer to show you this record:

Each *new* Puseyjones Cylinder Machine has broken former speed limitations *regardless of the product being made.*

Every Cylinder Machine *rebuilt* by Puseyjones, has reached and exceeded expectations—with better sheet quality, higher speed possibilities and furnish economies.

Outstanding Cylinder Machine improvements, like the Goldsmith Stream-Flow Vat System, are available on new or rebuilt machines. Machine change-overs are often accomplished in several steps – first, Stream-Flow Vat Systems with Flow Spreaders, later Vacuum Cylinder Molds, followed by Press improvements and added Dryer capacity.

Whatever your product may be—container board, folding boxboard, bristol and index, cylinder paper, felt, or special products – Puseyjones engineers will tailor the equipment to meet your needs. Write or call us today.

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THE SIGN OF TRADE MARK SUPERIOR QUALITY

that the maximum discharge would be used as a basis for ordering further reductions in pollution. At present, he explained, the solids being discharged by the mills are increasing rather than decreasing.

The first immediate reaction to the order from mill executives was a complaint that materials for building settling plants were becoming increasingly hard to get. They questioned the stand the Commission would take in the event a national emergency should rule out the possibility of obtaining needed materials.

Commissioner Victor Beresford assured mill officials that "we aren't going to ask you to do the impossible."

"We're not kidding ourselves," Mr. Beresford continued, "but we have to set up a positive goal to work toward. If you can't get materials you can't build treatment plants. It's as simple as that."

In a move to complete the first phase of the river cleanup in a broad sweep, the Commission also ordered the cities of Kalamazoo, Parchment, Plainwell, and Otsego to have sewage treatment plants in operation by the June 1, 1953, deadline.

Commissioners other than Mr. Beresford who attended the meeting were: Dr. Albert E. Heustis, chairman; Irving Ronk; Stanley Fontana; Glenn Manz; Burnett G. Abbott; and George McIntyre.

Marathon Research Develops Use for Spent Sulphite Liquor in Tanneries

Research in the laboratories of Marathon Corp., Rothschild, Wis., has resulted in the successful manufacture of tanning extract from spent sulphite liquor. Several leather tanneries in the United States are now using Marathon's product rather than materials which were formerly imported from South America.

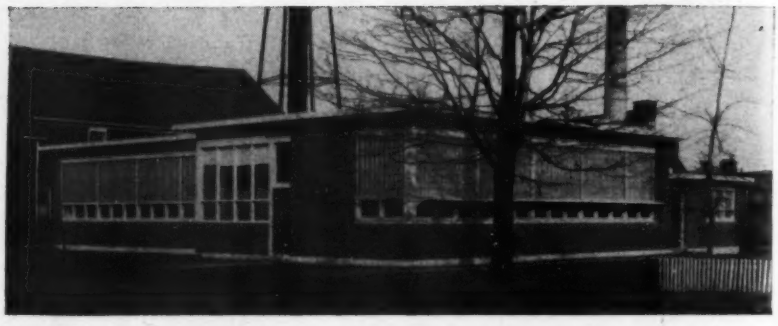
Marathon's chemical division is currently utilizing for various by-products as much spent sulphite liquor as it is able to collect from the pulping process. Plans are being made for the 1951 installation and development of more advanced collection equipment which will permit the processing and utilization of still more of the total of spent liquor.

Halifax & Albemarle to Reorganize and Make Improvements—Get RFC Loan

The financial program of the Halifax Paper Co., Inc., Roanoke Rapids, N.C., and The Albemarle Paper Mfg. Co., of Richmond, Va., affiliated companies, is to be reorganized according to a recent announcement released by F. D. Gottwald, president of both companies.

According to the announcement, a loan of $5,800,000 has been arranged by the RFC, and the companies have negotiated for the issuance and sale of a million dollars worth of preferred stock. The money thus obtained will be used for reorganization of both companies and provide funds for plant expansion at the Halifax company.

A guaranteed maximum type of contract has been signed with Rust Engineering Co., Pittsburgh, to cover the Roanoke Rapids plant expansion. Equipment provided in the contract includes a coal or oil-fired boiler of a rated capacity of 45,000 pounds of steam per hour, a high density pulp storage tower, and a new paper machine and mill building. The new building will house the associated stock preparation equipment and necessary finishing and shipping facilities. This building will be constructed of such proportions that a second large paper machine may be installed later at a minimum cost and without disturbing the then existing operation. Barring unforeseen developments, this work should be completed by the end of 1952.



New office building occupied by St. Croix Paper and Eastern Pulp Wood Companies

St. Croix Paper and Eastern Pulp Wood occupy new office building

Accounting departments of St. Croix Paper Co. and Eastern Pulp Wood Co., both at Woodland, Me., are now located in a new office building built at Woodland headquarters of the two companies.

The 82 x 62 ft. building presents an entirely new type of construction for the Maine area; it is one-story and has no basement. It does have foundations and walls of sufficient strength to support another story if further expansion is necessary. The front of the building—which faces west—and the side facing south are made of brick and glass block construction with a row of plain glass sash between the brick wall and glass blocks. East and north walls are of brick with plain glass windows. Walls of the rear section of the building—where vaults and service rooms are located—fall four feet short of being as tall as the remainder of the office. Such design permits a row of windows just below the roof which extend the entire length of the building to provide additional overhead lighting and ventilation.

Driveways on each side of the building allow access to a parking space which will accommodate about 20 autos.

The St. Croix mill supplies steam heat; all pipes are carried in subways to a utility room at the rear of the building, and concealed ducts beneath the floor permit efficient warming of the rooms. Telephone and electric wires are carried in underground conduits said to be foolproof and safe from interference.

Private offices for the company treasurer and auditors are located in the new offices. In the utility section of the building is a lunch room, equipped with cooking facilities for the use of employees. A conference room, cashier's offices and waiting room are located at the rear of the building where a separate entrance is located.

New Million-Dollar Plant Started in Dallas by U.S. Envelope Co.

Production has begun at the new million-dollar plant of United States Envelope Co., completed recently at Dallas, Tex. Ground for the 50,000 square foot building was broken July 15; on January 2 testing operations began in a small way, and full production began a few days later.

The building, among the world's most modern in design, has no windows; temperature control is thereby assured.

Paper is unloaded from a track spur behind the building; each process in

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JEROME P. (JERRY) STRASSER

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THE Morningstar organization has arranged a convenient place for you to visit and relax. Here, in the CLUB SUITE on the THIRD FLOOR of HOTEL COMMODORE, from 6 P. M. Monday through Wednesday evening, you'll find an atmosphere of comfort, hospitality and genuine good fellowship. The convenient CLUB SUITE is readily accessible to the convention floor. Come in . . give us the pleasure of personally renewing old friendships . . or, if a stranger, to greet you for the first time.

MEET JERRY STRASSER..
New Head of the Morningstar Paper Department

The Paper Convention provides an excellent opportunity to introduce Jerry Strasser, as the newest member of the Morningstar organization. Mr. Strasser will direct the development and application of M. N. I. Starch Specialties and Adhesives to the paper industry. Long recognized as one of the leading authorities in this field, he will be available to you together with M.N.I. Laboratory and Technical Field Men, for consultation or interchange of technical ideas. Here's looking forward to the pleasure of seeing you!

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NEW YORK 19, NEW YORK

1770 CANALPORT AVENUE
CHICAGO 16, ILLINOIS

manufacture is in a straight line, and finished envelopes arrive at the loading dock in the front of the building without ever having to detour or backtrack.

If the operation proves successful, United States Envelope may expand its facilities, according to Evert F. Anderson, Southwest Division manager; the track on which the new building is situated will permit tripling of facilities. At present the plant employs 125 to 150 workers operating on a one shift basis.

Customers in Texas, Oklahoma, New Mexico, Colorado and parts of Missouri, Kansas and Louisiana will be supplied from the Dallas operations.

Olin Industries Finishing Cellophane Plant at Ecusta

One of the world's newest and most modern cellophane plants is now being built at Pisgah Forest, N.C., for Olin Industries, Inc., East Alton, Ill. Scheduled to be in operation by September of this year, the eight-machine plant will produce an estimated 33,000,000 pounds of cellophane annually.

Olin's entrance into the cellophane field was revealed November 7, 1949, in an E. I. duPont de Nemours and Co. announcement that duPont had licensed Olin Industries to manufacture cellophane. (Cf. P.I. and P.W., Dec., 1949) On November 25 of that year, John Olin announced that his firm would locate its initial cellophane facilities at the plant of Ecusta Paper Corp., an Olin subsidiary, at Pisgah Forest.

C-Z Experiments on Use of Alder as Source of Pulp

Experimentation on the use of alder logs in the production of paper pulp is being carried on at the Camas, Wash., plant of Crown Zellerbach Corp., San Francisco. Approximately 2,000,000 feet of alder will be cut this winter at the firm's Astoria, Oregon, timberlands for use in the experiment.

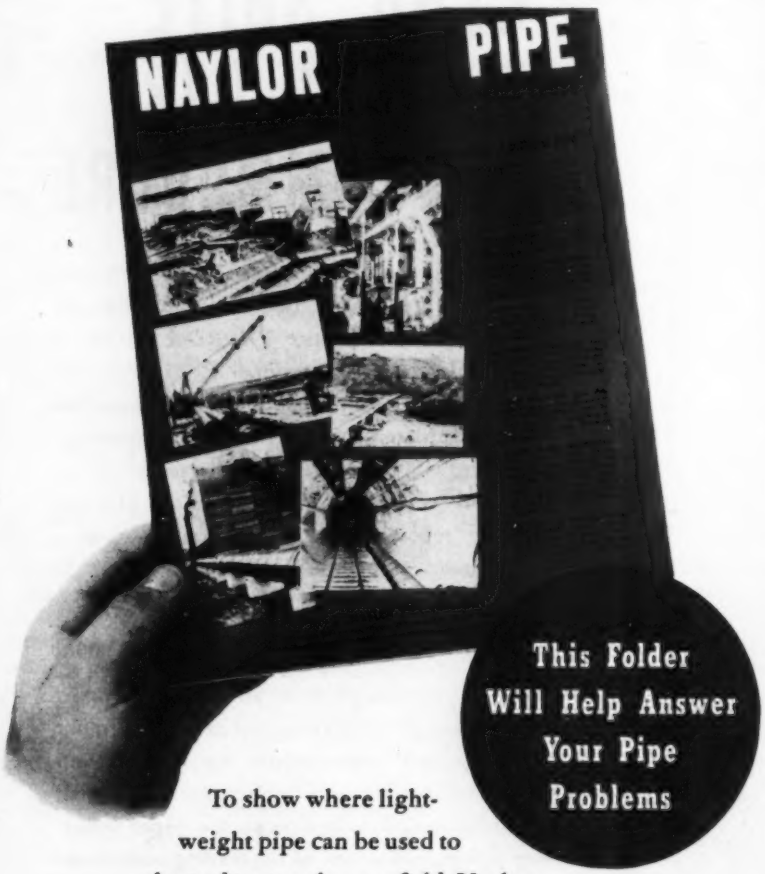
The company expects the alder to make a short fiber paper of little tear strength but with a smooth surface suitable for printing which will be quite soft for tissue paper usage. C-Z has been experimenting with the manufacture of paper from alder for some time; thus far, the major problem is the elimination of a pink color which develops in the papermaking process.

HALF A MILLION Norway and jack pine seedlings will be distributed free by Nekoosa-Edwards Paper Co., Port Edwards, Wis., to landowners in three counties adjacent to the firm's mills. This is the third year the company has given trees for reforestation of private lands. In 1949, 200,000 trees were planted by private landowners under the plan; in 1950, 381,000 more trees were added. No more than 3000 trees will be given to any one person in 1951.

NEW AND LARGER offices in Washington, D.C., have been opened by Ebasco Services, Inc. The new office, located at 1625 "I" Street, N.W., will continue under the management of W. B. Cosdon.

A CONSOLIDATED RESEARCH and development department has been established by St. Regis Paper Co., New York. Under the direction of Dr. Kenneth A. Arnold, formerly research director of the Multiwall Bag Division, the department will carry out functions heretofore performed separately for the Printing, Publication & Converting, Kraft Pulp & Paper, and Multiwall Bag divisions of the firm. Dr. Arnold will make his headquarters at Deferiet, N.Y.

CONTINUOUS ADEQUATE SUPPLIES of pulpwood will be guaranteed for The Macon Kraft Co., Macon, Ga., with the purchase of 19,700 acres of land in the state. Purchased through the company's subsidiary, Interstate Land and Improvement Co., all bare sections of the land will be seeded immediately; timber now standing will be replaced as used, through a reseeding program.



To show where light-weight pipe can be used to best advantage in your field, Naylor has prepared this handy folder. It gives you helpful specifications on Naylor pipe, fittings, flanges and connections in concise form. Write today for your copy of Bulletin 507 . . . without obligation.

NAYLOR PIPE

Naylor Pipe Company, 1236 E. 92nd St., Chicago 19, Ill.
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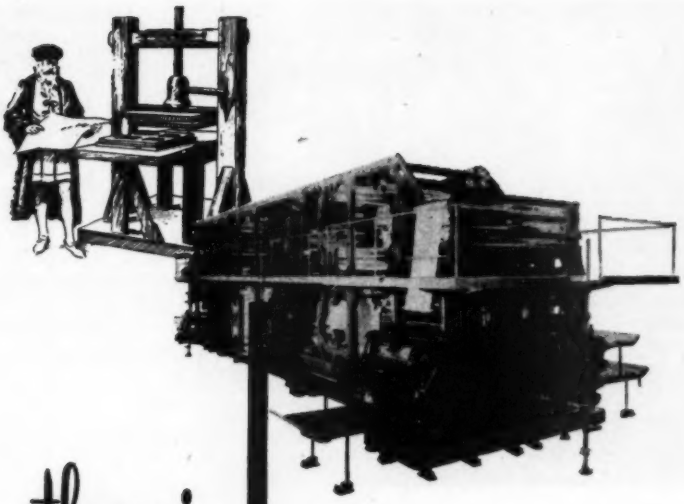

there is always room FOR IMPROVEMENT

That's why Bagley & Sewall have developed an entirely new concept of

WINDING EQUIPMENT

By the time this advertisement is printed, the first units of our modern slitter-winders will be coming off the production line. They will be installed in several mills . . . destined to establish new records in speed, economy and efficiency. These first units were ordered from blueprints. They were ordered because even in the blueprint stage they showed convincing evidence of their superiority. They were ordered because the hundred-year old manufacturing experience and outstanding reputation of Bagley & Sewall provided additional guarantee of their sound design and honest workmanship.

If you wish to modernize and speed up your winding, slitting, or laminating operations or are contemplating to expand present facilities, it will definitely pay you to investigate the radically new and greatly improved machines designed by the B-S engineering staff. Write today for full details to The Bagley & Sewall Company, 500 Fifth Avenue, New York 18, N. Y.

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PAPERMAKING MACHINERY

SINCE 1853

500 FIFTH AVE., NEW YORK 18, N. Y.

OPEN HOUSE was held in plant of Hanchett Mfg. Co. where its knife grinders are built

Hanchett Mfg. Co. Holds Open House to Demonstrate Knife Grinding Equipment

In December, the Hanchett Mfg. Co., Big Rapids, Mich., held open house for the purpose of exhibiting and demonstrating the latest developments in knife grinding equipment. Featured were several new machines including a 212 inch hydraulically driven A K knife grinder that was subsequently shipped to the Hoberg Paper Mills in Green Bay, Wis.

The first hydraulically driven traveling head knife grinder to be installed in a pulp and paper mill was shipped in November, 1950, to the Crown Zellerbach Corp., Carthage, N.Y. Latest type grinding machines have recently been purchased by the St. Regis Paper Co., Pensacola, Fla.; S. D. Warren Co., Cumberland, Me.; Halifax Paper Co., Roanoke Rapids, Va.; Weyerhaeuser Timber Co., Coos Bay, Oregon.

Westinghouse Plans Two New Plants for Small Motors Division

A new plant for the production of small electric motors will soon be erected at Union City, Ind., by Westinghouse Electric Corp., Pittsburgh. The new plant, planned as a one story structure which will contain both manufacturing and office space, is needed to fill the increasing demand for fractional horsepower motors now needed in the nation's defense program. About 500 workers will be employed in the plant when it begins production some time late this year. Ralph E. Davis, formerly plant superintendent at the Westinghouse small motor plant at Bellefontaine, Ohio, will be in charge of the new plant.

Westinghouse has also leased two buildings, totaling about 120,000 square feet of space, at Lima, Ohio, headquarters for the firm's Small Motors Division. The larger of these buildings will be used to make machined parts needed at the main Lima plant for military production; the other will serve as office and storage space.

Jerome Strasser now with Morningstar, Nicol

Better and wider coverage to the paper industry, both as to product and service is promised by Morningstar, Nicol, Inc., New York City. In support of this comes the announcement that Jerome P. Strasser, former vice president of Stein-Hall and Co., in charge of the paper department, is now associated with Morningstar, Nicol, with headquarters at the company's main office in New York City. This connection was effective January 7.

Jerome Strasser

With the help and consultation of Mr. Strasser, the Morningstar laboratory staff is developing several innovations in starch products which will be announced soon. Technical servicing of paper industry sizing, coating, and adhesive problems will continue to be a function of the company's laboratories.

A TABLE ON TOLERANCES for round and alloy steel mechanical tubing has been published by The Babcock & Wilcox Tube Co., Beaver Falls, Pa. Available on request from the company the table, known as data card 1150, gives permissible variations in diameter and wall thickness of round seamless carbon and alloy steel mechanical tubing. Information is included on cold-drawn-unannealed and finished-annealed tubing in sizes to 8⅞ inches outside diameter, and to hot-finished tubing in sizes to 9⅝ outside diameter.

Reorganization at Acme Steel Brings Sales Appointments

Organizational changes in the eastern and southern field staffs of Acme Steel Co., Chicago, have resulted in the appointment of William E. Close as national account supervisor for the eastern area. Mr. Close's former responsibilities as New England district manager have been assumed by Vincent F. Murphy; with Mr. Murphy at Boston headquarters are Gardner W. MacDonald, Jr., and George R. Timm, newly assigned sales representatives.

William G. Polley, sales engineer, has been assigned to the staff of W. S. Huss, southern division sales manager, and will provide specialized customer service from Atlanta, Ga. At the new Atlanta headquarters of a sales district which includes Florida, Georgia, Alabama and Tennessee, Clarence A. Carrell will serve as district manager; G. R. Easley will have like responsibilities for Virginia, North Carolina and South Carolina from Greenville, S.C., headquarters. Mr. Easley's former work as sales representative has been assigned to Judd B. Farr; John J. Jorgensen has been transferred to the Chattanooga, Tenn., sales territory as representative.

FIRST SOUTHEASTERN divisional manufacturing plant established by Westinghouse Electric Corp., Pittsburgh, is being leased at Hampton, S.C., from Plywoods-Plastic Corp. for the manufacture of Micarta. The new plant, equipped with various types of plastics processing machinery, will begin operation early this year. Primary production will be of decorative materials for homes and offices, although the plastic is also used for several industrial items. The parent Micarta manufacturing division is at Trafford, Pa.

IMPORTANT CONTRIBUTIONS IN the field of materials handling manufacture have been made by Stephens-Adamson Manufacturing Co., Aurora, Ill., which is now observing its fiftieth anniversary. Beginning operations in 1901 in a single 80 by 120 foot building, the firm now occupies a 13 acre site with 230,000

COSTS GOING UP ?

...MATERIALS GETTING SCARCE

One answer is to effect savings in materials . . . lower production costs. A practical answer is the Curlator, for Curlators are accomplishing just those things. In commercial operation Curlators have increased the yield of unbleached sulphite pulp as much as 10%. In addition more than enough sulphur, coal and limestone has been saved to pay all their operating and maintenance costs. Write for more detailed information. There is no obligation.

SAVE $$$.....in Pulpwood Coal Limestone Sulphur with Curlator

FIND OUT WHAT SAVINGS CURLATOR CAN MAKE FOR YOU

Operation Proved

CURLATOR* Corporation

565 BLOSSOM ROAD · ROCHESTER 10, NEW YORK

*T.M. Reg.— Curlator Corporation, Rochester, N. Y.

CURLATOR CORPORATION
Rochester 10, N. Y.

I would like to be shown what Curlator can do for me.

NAME_____

ADDRESS_____

CITY_____ STATE_____

square feet of plant space. In 1907 the firm equipped the first commercially successful self unloading bulk freight boat on the Great Lakes; its most recent innovation is the Zipper conveyor, introduced in 1944, which forms an endless tube when closed and carries material vertically, on inclines, and horizontally.

R. S. Aries & Associates Offer a New Service

Formation of a new Statistical Engineering Division has been completed by R. S. Aries & Associates, New York. Statistical methods have long been known to be important to the chemical process research, development and production fields, but heretofore have been neglected in some researches. The Aries firm offers reduction of uncertainties of pilot plant work, less waste in raw materials and supplies, lower process costs, improved research efficiency, better product quality, and higher process yields through application of statistical methods.

The new division will be under the direction of Frank M. Culpepper, Dr. David B. Hertz, and Dr. Sebastian B. Littauer.

Expansion costing $1,500,000 planned by Reliance Electric

The rapidly increasing demand for electric motors and controls made by the military services and industries going into national defense has necessitated an expansion in manufacturing facilities of The Reliance Electric & Engineering Co., Cleveland.

At a cost in excess of $1,500,000, the firm is constructing a one story building of 130,000 square feet in Cleveland. It will be similar to a plant of about the same size built by Reliance in Ashtabula four years ago. In addition to housing the company's engineering, development, research, and renewal parts departments the new structure will be used in the actual manufacture of Reliance equipment.

Since work will begin very shortly on the new facilities, the structure should be ready for occupancy by next summer.

Ryerson Opens New Service Plant in Cincinnati

In a move planned and carried out so as to result in the least amount of inconvenience to customers, Joseph T. Ryerson & Son, Inc., Cincinnati, have moved into their new and larger steel-service plant and office building at 3475 Spring Grove Ave. The $1,000,000 plant replaces the company's former headquarters at Front St. and Freeman Ave., which had been occupied since 1923, when Ryerson began business in the Cincinnati market with the purchase of plant and stock of Cincinnati Iron and Steel Co.

The mail address of the firm, Box 300, Cincinnati 14, remains unchanged although it has been necessary to change to a new telephone number, Kirby 3241.

New Research Center Is Built by Wyandotte

A new research center planned for the Wyandotte, Mich., headquarters of Wyandotte Chemicals Corp. will permit expansion of research and development activities of the firm. Housed in a functionally engineered two story structure of modern design, the research center will be erected near the firm's administration building. Occupancy of the center, which will cover space a block long and half a block wide, is planned for mid 1952.

Consolidation of Wyandotte's many research and development activities at the new location will enable the firm to expand its scientific and technical staffs to handle not only long range research in the organic and inorganic chemical fields, but also special research projects undertaken by the company in behalf of the national defense program.

ALL INQUIRIES RELATIVE TO Kohler unwinding and winding equipment should henceforth be sent directly to the Dilts Division of The Black-Clawson Co., Fulton, N.Y. This change in procedure is necessitated by the retirement of Franklin W. Kohler, former sales and engineering representative, from Black-Clawson service. John B. Kohler will continue as company consultant.

A CANADIAN PLANT will be opened at Brantford, Ont., by Gardner-Denver Co., Quincy, Ill. Key production men will be temporarily transferred from the home office to provide initial supervision for the new plant, to be operated by Gardner-Denver Co. Ltd.

AT AN INVESTMENT of about half a million dollars, Sterling Electric Motors, Inc., Los Angeles, will build a branch plant at Van Wert, Ohio, to serve midwestern and eastern business. Executive offices of the company will remain in Los Angeles.

CINCINNATI OFFICES OF the Michigan Alkali Division of Wyandotte Chemicals Corp., Wyandotte, Mich., have been moved to 825 Dixie Terminal Bldg., Cincinnati 2. The telephone number of the new offices is Cherry 4941.

CONSTRUCTION HAS BEGUN on a new project at the Houston, Tex., electrochemical plant of Diamond Alkali Co., Cleveland, which will increase capacity of the plant by 50 per cent. The additional capacity is being acquired by minor alterations to existing buildings; the only new structure planned is a warehouse already under construction. Diamond's Central Engineering Department designed the project.

A FRANCHISE HAS BEEN GRANTED by Cleveland Tramrail Division of The Cleveland Crane and Engineering Co., Wickliffe, Ohio, to Nelson J. Leonard to cover the entire Northwest territory as representative for the firm. Mr. Leonard, who has represented the Division in Washington for many years, maintains his offices at 5764 Twenty-eighth Ave., N.E., Seattle.

ACQUISITION OF the Delta Star Electric Co., of Chicago, has been announced by H. K. Porter Co., Inc., Pittsburgh. The Delta company designs and manufactures a variety of fittings, switches, insulators, conductors, supports and related equipment for the control and transmission of electricity around central power stations, substations, and transformers. There will be no change in the operations or management of the Delta company.

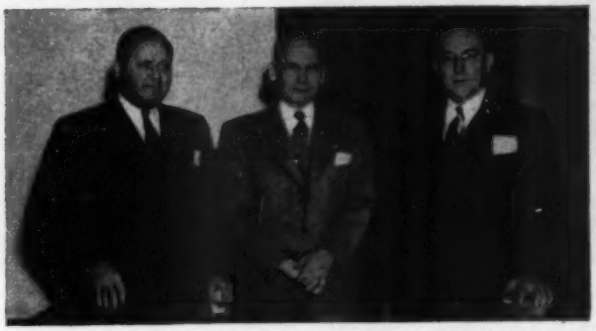
FOR A REPORTED PRICE of $550,000, Minneapolis-Honeywell Regulator Co., Minneapolis, has purchased a 110,000 square foot manufacturing plant at Philadelphia from Thomas M. Royal Co. The three story plant has been unused since Royal, which has another factory in Beaumont, Texas, discontinued Philadelphia operations last August.

CONTRACTS HAVE BEEN AWARDED to The H. K. Ferguson Co., Cleveland, Ohio, by Baroid Sales Division of National Lead Co., for construction of a new office building and research center. Scheduled for completion in July, the two-story building will contain approximately 40,000 square feet and will be built of reinforced concrete and masonry.

MIDWEST CUSTOMERS of Dewey & Almy Chemical Co., Cambridge, Mass., will be supplied more efficiently with Cry-O-Rap plastic bag with the construction of a new manufacturing plant at Cedar Rapids, Iowa. Present plans call for a plant capable of producing 100,000,000 bags a year with a working staff of 200 employees. Cedar Rapids was chosen as the location of the new plant because of its proximity to a number of Iowa food packers.

The Paper Industry Pictured Highlights

D. C. EVEREST, leading forestry conservationist, and board chairman of Marathon Corp., has been elected as 21st president of the American Forestry Association which is celebrating its 75th anniversary this year. (See Associations)



THREE EDUCATORS — well known in the paper industry—spoke at the January meeting of the Chicago Section of TAPPI. Representing three schools that offer technical training in pulp and paper technology, they are: L to R—Dr. A. H. Nadelman, Western Michigan College, Kalamazoo, Mich.; Dr. Harry F. Lewis, Institute of Paper Chemistry, Appleton, Wis.; Prof. C. E. Libby, New York State College of Forestry. (See Associations)

CRYSTAL and GEM formerly used by The Crystal Tissue Co., Middletown, Ohio, to identify its tissue products, now has been designed for use as the company's over-all trade-mark and will be seen on all products and labels. Crystal's president, E. E. Grant, is shown (at left) with Vice President L. J. Long (at right) as they awarded watches to three employees with 25 years of continuous service. Recipients: Hiram E. Reed, paper machine tender; Joe R. Meadows, machine room employee, and Miss Calista Van Horn, assistant treasurer.

A NEW COURSE OF TRAINING in paper engineering has been inaugurated at Lowell Textile Institute, Lowell, Mass. Based on a study of paper mills within that state, the Institute has decided to concentrate on papermaking and paper converting rather than on pulp manufacture. Funds have been granted for the addition of a building to house the most modern equipment and research apparatus. The curriculum will major of engineering subjects rather than technical.

MISS WINDY CITY (Adrienne Falcon) illustrates a new use for broom. Paper stacked broomstick height will weigh approximately 100 pounds. National campaign for conservation of waste paper as vital to national defense is conducted by Midwest Consumers of Waste Paper.

1936—First home of Andre Paper Box Co., founded with only $350 capital

1950—New half-million-dollar folding box plant at San Leandro utilizes modern equipment including specially developed laminating machinery

Newest Pacific Coast box plant

▶▶▶ COMPLETION OF a new half-million dollar plant has written the latest chapter in the growth of a western firm founded in 1936 with only a back-alley plant, a $350 investment, and the determination to make better packages. This is the story behind the current expansion of the Andre Paper Box Co. of San Francisco, makers of special folding boxes for food, gifts, flowers, candy, department stores, and many other fields.

The new plant is located across San Francisco Bay at San Leandro, Calif. In announcing its completion, Noble Andre, owner and general manager, said: "We are now in full production—in fact, the new factory is making as many boxes in a single day as the company made during its entire first year of operation. We're proud of that, but we're just as proud that we're still making boxes there for most of our original customers."

Andre knows these customers well. He personally delivered boxes to them when he and a partner founded the firm with only a small hand-press and one employee in a little building on Natoma, an alley between Mission and Howard Streets in San Francisco. In 1939 he purchased his partner's interest and moved the business to slightly larger quarters on Minna Street. Concentration on better methods of folding box production and styling brought more sales. In 1943, the company bought a five-story building at 545 Mission Street. There its production and research were expanded and mechanized, especially in boxes made from laminated paperboard.

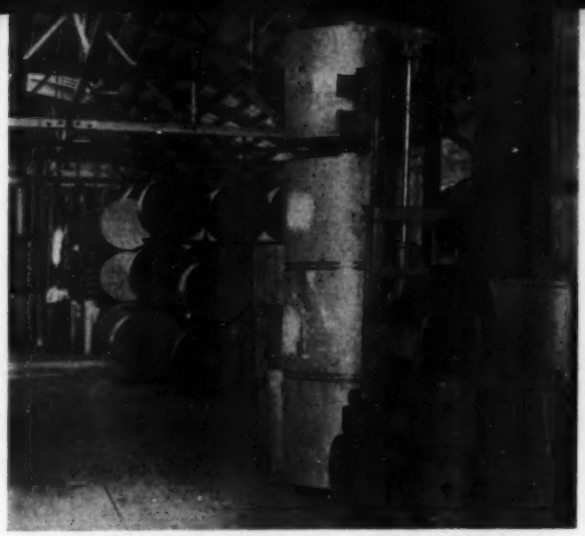
Much of the company's progress during the past six years may be traced to its work with laminated board. Today 90 per cent of its operations deal with lamination in one form or another. The new laminated folding boxes, for example, have virtually replaced set-up boxes in many West coast stores.

Development of these new folding boxes, lined with fancy papers and foils, was started by the company with the aid of an old sheet-liner machine. Increased sales demand led to a search for a machine capable of producing laminated sheets that would lie flat without curling at high speeds. Such a machine could not be located. Consequently, the company hired engineers in the mechanical, electronic and chemical fields. Plans were drawn and a laminator of special design was built.

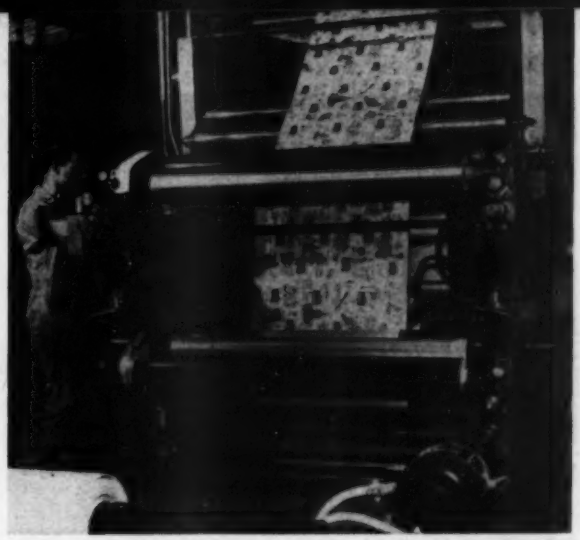
In 1949 one of the large paper mills asked the company to build a similar

OLD HAND PRESS and first employee, Martin J. Erjaver (L), now production manager

WIDE VARIETY of packages made by Andre Paper Box Co. with Noble Andre, owner and general manager



LIFT TRUCK transports rolls of paper and paperboard to the laminators and presses



FOUR-COLOR ROTARY PRESSES (Wolverine) print box design on paper which then passes directly to the laminator

makes laminated folding boxes

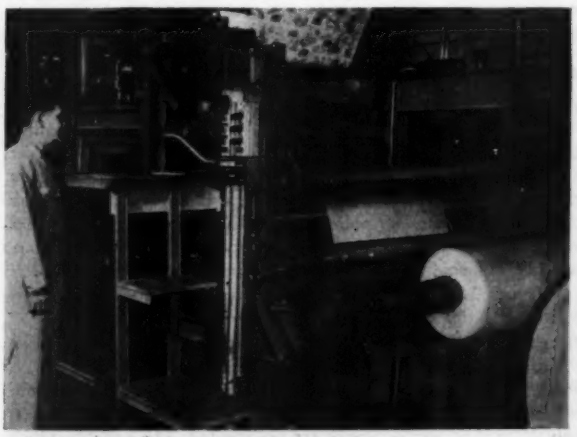
unit for them. The resulting ANDRE-matic Laminator embodied all of the principles of the first machine, with greater strength and the ability to stand up under extremely high speed production. Completely automatic, it requires only two operators. Its features include electric-eye registration control, special "anti-curling" safeguards and automatic sheeting and stacking.

With this method of making folding boxes, high speed 4-color rotary presses print the desired design in register for cutting presses on roll-fed paper. This is then automatically laminated to boxboard, also roll-fed, by the ANDRE-matic Laminator. The efficiency and economy of this operation have led other firms to acquire the machines. At this writing, seven such units are operating.

Demand for laminated boxes kept growing and the production facilities of Andre's Mission Street plant became inadequate. Thus the present five-acre site at Leandro was purchased. Construction of the new steel and concrete factory began early in 1950. During the same period the company's marketing area was extended to the Midwest with the establishment of another factory and sales office at Chicago.

Two ANDRE-matic Laminators are in use at Andre's new plant. Other equipment includes a broad range of gluing machines, all made by International Paper Box Machine Co.; Staude cellophane window machines; and an extremely flexible array of Miehle printing and cutting equipment. All of the latter are made by Miehle, with the exception of the high speed 4-color rotary presses in the laminating lines, supplied by Wolverine Paper Converting Machinery Corp.

The new San Leandro plant is claimed by Andre officials to be the most modern folding box factory on the Coast, if not in the nation. It is designed for fast, flexible production. Cantilever-braced roofs eliminate any need for columns or bracing posts—permitting the use of a broad range of materials handling methods, from lift trucks to conveyors. The new plant has both rail and truck loading facilities and is but a short distance from the Oakland airport. It houses the firm's purchasing office, as well as its production, die-forming and warehouse facilities. Andre's main sales office, headed by Arthur J. Loesch, and its research and design department, under Douglas Ames Wheelock, remain at 545 Mission Street in San Francisco.



ANDRE-matic laminator continuously and automatically bonds roll-fed paperboard to the printed paper which comes direct from press

LAMINATED SHEETS, ready for the cutting and creasing presses, are stacked on this automatic layboy

1 Old method of lighting a cylinder machine vat where maintenance conditions are severe

2 Self-contained reflector lamp improves visibility and brings into focus objects not seen in other view

5 Lights over the aisle mounted at an angle to illuminate both paper machines

6 From wet end to winder, all operations on this paper machine are well illuminated

How you can improve the lighting in your plant

Do your employees grope their way through a work day? If inferior illumination is shrouding your plant in semidarkness, you have a problem. Two experts have collaborated to shed some light on this subject.

J. L. TUGMAN and E. A. LINDSAY
Lamp Dept., General Electric Co.

▶▶▶ GOOD PLANT LIGHTING can no longer be considered as a luxury nor as just a necessary overhead item. It can and should be considered as an investment in efficient and economical operation. Modern successful plants insist on the best in tools, business machines, and labor. It is equally important that they insist on the best in lighting installations; lighting designed to be adequate in quantity, of such a quality that it will be comfortable for the worker's eyes and will do its part in creating a pleasant, efficient working environment.

Material submitted by these authors has been combined into one presentation. That part of the article submitted by Mr. Lindsay (a widely-experienced industrial lighting specialist) is from a paper presented by him at the joint meeting of the Miami Valley Division of The American Pulp and Paper Mill Valley Division of The American Pulp and Paper Mill Superintendents Association and the Ohio Section of TAPPI, held Oct. 10, 1950, in Middletown, Ohio—*Editor's Note*

Management problem

A paper industry executive, charged with the responsibility for providing efficient plant facilities, need have no real difficulties with respect to lighting. There are exceptions, of course, but in the majority of cases where lighting problems are discovered, it is usually due to a previous inattention to the importance of this facility. Lack of good lighting can be the cause of serious production handicaps. Poor lighting can impress its effects throughout an entire operation. Plant morale is frequently the area of critical difficulty stemming from lack of appropriate lighting policy.

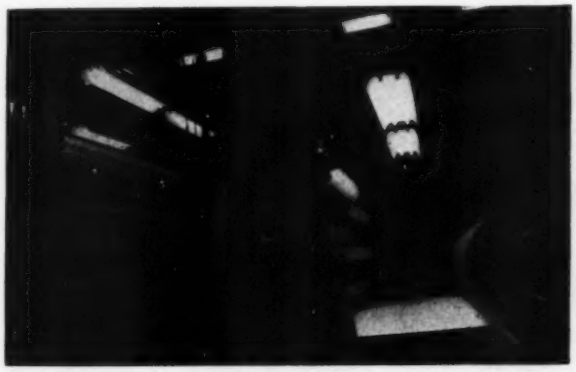
Since few people are quick to spot trouble from this source, aggravated conditions can exist for a long time. Along with associated obstacles to production, if a given management has faced no compulsions to seek the economies lighting can produce, the burdens are accepted unrecognized. However, all these adverse effects of poor or bad lighting can and should be banished. The chief reason for getting rid of them is that they are so expensive.

While good lighting cannot guarantee larger production per worker or lower unit costs, it is observed that where management insists on a sound lighting policy, it usually associates it with other elements of good plant housekeeping. It is generally true also that the well kept plants are identified with the most economical production.

If a management is concerned with its labor costs (and what management is not) it must give the most careful consideration to the options where its decisions are undisputed. The benefits which flow from good lighting are almost whol-

3 Under-the-hood illumination and angle floodlights mounted on the building wall

4 Same machine room as No. 5, showing overhead fluorescent light



7 Supplemental fluorescent units are employed over calender and reel

8 A lighting level of about ten footcandles is quite sufficient for handling broke

ly within this exclusive field of management determination.

With good lighting, adapted to the task, every worker is capable of seeing detail more clearly and more quickly. With good lighting he generally feels better (other plant policies being equal), since his environment is actually more cheerful. In this connection it should be noted how much attention is being given to the use of color in manufacturing interiors.

This trend is not just a fancy way of diverting surplus back into the plant. It is, in fact, an element of the very serious thought management is giving to its own opportunities for influencing the worker's potential for higher production and a keener interest in his work.

Safety improves with good lighting

Such activities relate to the allied objectives of eliminating job monotony and worker dissatisfaction arising from eyesight deficiencies. Recasting a job or selecting a new employee on the basis of a careful test of his seeing are relevant new management opportunities. Relevant, of course, insofar as they are conceived for plants where the general facilities of heat and ventilation and lighting have previously been co-ordinated purposefully.

A very substantial reason for good lighting in industry is safety. This is another aspect of the good plant housekeeping program. Lower industrial insurance premiums should be an attraction for many plants now in the higher brackets. Today, the savings in safety through better lighting and better seeing are instrumental in re-designing some types of operations. Traditionally dirty industries in which the manufacturing process has been associated with smoke and dust and steam, impeding the purpose of illuminating and depreciating the output of fixtures by coating lamps and reflecting surfaces, are investigating new techniques. In general, they seek to minimize the number of seeing tasks in the unavoidably dirty areas, by automatic processes. Elsewhere they seek to create working conditions unaffected by the dirt and smoke of other departments. Safety hazards can be reduced substantially, it appears, where sincere efforts are made to do so. Premiums saved, improved morale, and production gains are the eminently rewarding possibilities.

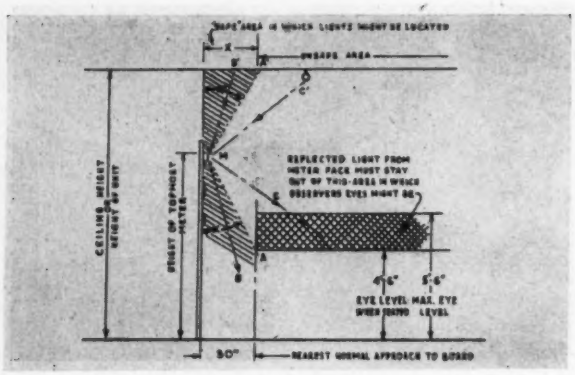
Maintenance

It is not enough for management to make the initial outlay for a good lighting system and thereafter forget what the purpose was. Along with the decision to have good lighting there must be the supporting decision to maintain the system chosen at a standard that will sustain easy seeing.

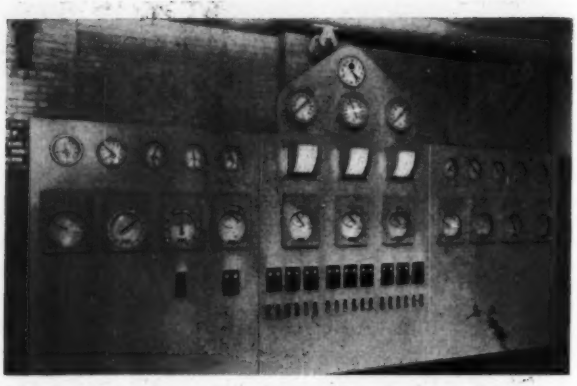
A simple scheme for assuring sustained light output in a well-designed system is to replace all lamps periodically before the lamps reach the end of life. As against piecemeal replacement when outages occur, group replacement is an easy way to over-all economy. When lamps have burned, say, about three-quarters of normal life, one shot, group replacement offers a quick return to initial efficiencies. Tied in with the periodical cleaning of fixtures and general reconditioning of plant surfaces (washing and/or painting), group replacement makes a key feature in any industry's modern plant lighting policy.

Consider the windows

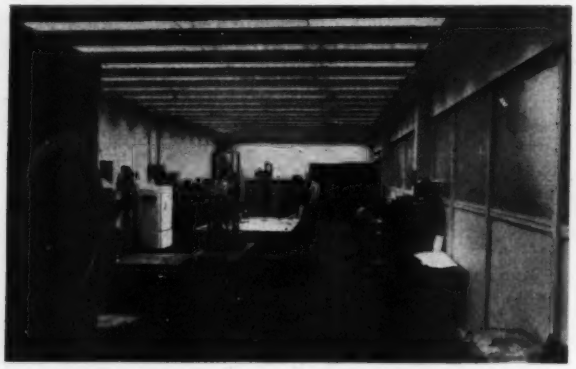
If your plant was built in the days when it was considered advanced merely to provide a lot of window area, give a look around to see how much window space as been painted out to reduce glare. Whether or not any windows have been painted out, it is quite likely that a little investigation will reveal that window glare at certain times of day, particularly when the windows are dirty, is very objectionable. It will also be discovered that useful levels of illumination are not available even on clear days for more than a few feet inside the windows.



9 How to locate panel board lighting so that it will be within a safe area



10 Control panel properly color conditioned. Proper brightness often can be effected by light colors of paint



13 A well-lighted laboratory surrounds workers with a comfortable environment—is an asset to research

14 Stockroom lighted by continuous fluorescent lamps. No time lost hunting for materials

In large parts of the country where overcast days predominate the use is substantially lower.

The point you will be impressed with in checking up on windows is how prone we are to assume things about lighting on the basis of untested inferences. When plant personnel is oriented so that it faces *away* from windows, when the windows are shaded so they will not be glare sources at certain times of the day, when windows are valued for the psychological advantages of looking out, rather than for letting light in; then the problem of artificial lighting may be seen in its proper perspective. Then it will be noted that what it takes to deliver ample, good quality illumination to each work position, free from glare at all positions, is worth insisting on as a plant policy.

The lighting problem

Good lighting pays its way and it helps an otherwise efficient producer to increase his earnings. Every plant pays the charge for good, well maintained lighting whether it actually has it or not. Any plant management now operating without a consistent, work-related lighting plan pays punitive damages for its lack of alertness.

The specifications of lighting for any manufacturing process should be related to requirements suited in general to its nature and with special reference to characteristic seeing tasks. If seeing tasks are difficult or prolonged, then not only high levels of illumination are required, but specially adapted supplementary lighting may be necessary to make the seeing easy. Basic factors involved are the size of detail to be observed, its color and contrast with its background (does it stand out, or does it blend so that it is hard to see), the length of the individual seeing operation, extent to which the task is repetitive (is it intermittent or continual), is it moving, and whether color discrimination is involved. Thus, the lighting of paper making processes may fall into two general classifications: (1) those in which the visual tasks are not unduly severe (which may be adequately served by a good system of general illumination) and (2) those requiring special treatment.

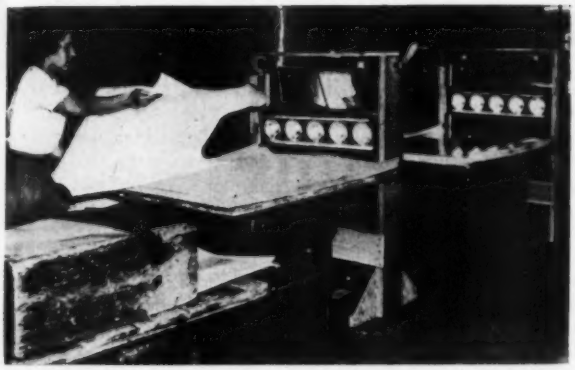
In general, lighting systems should not only give a good distribution of light over the area, but shadows should not be pronounced. These requirements are, in most cases, best met today by lighting systems employing fluorescent lamps where the mounting heights do not exceed approximately 25 feet. They combine high efficiency with low brightness (for eye comfort) and good color rendition. The lighting recommendations usually warranted for areas of this type are in the 40-50 footcandle range and usually utilize two-lamp fluorescent equipment.

In relatively high bays (above approximately 25 feet), filament or mercury lamps, or a combination of filament and mercury, are often best adapted. They are preferred over fluorescent because of reduced maintenance costs even though the system is somewhat less efficient. The illumination level should usually be in the 40-50 footcandle range.

Paper machines

On some parts of the machines it is difficult to supply adequate illumination because of severe operating conditions. Flying water and pulp constitute a severe maintenance problem where lighting is mounted close to the wet end of the machine. Figures 1 and 2 illustrate one solution to this difficult problem. A 150-watt PAR-38 flood lamp is shown mounted at the edge of the vat to illuminate the cylinder mold. Even though there is a considerable amount of mist present, the lighting effect is good, and equally important, the self-contained reflector lamp is practically impervious to breakage by water or mechanical abuse.

Figures 3 and 4 show two views of a typical paper machine. One is taken un-



11 Inspection of finished sheets with glare-free automotive fog lamps

12 Inspecting for minute defects by using a reflected brightness pattern.

15 Well-lighted machine shop lends a cheerful working environment . . . a comfortable brightness pattern

16 Modern office where workers suffer no eyestrain or fatigue . . . better efficiency results

der the hood showing the lighting supplied to the upper part of the machine by the under-the-hood illumination. The lighting consists of 100-watt lamps in vapor-proof equipment mounted on 5-foot centers to supply adequate illumination on this portion of the machine. For the more difficult seeing tasks on the lower part of the machine, angle floodlights are mounted along the building wall. 750-watt incandescent lamps are used in these reflectors, which are spaced on 9-foot centers.

The other view of this machine shows the general lighting in the room supplied by semicontinuous rows of two-lamp 40-watt fluorescent equipment (fixtures on 8-foot centers in rows). Figures 5 and 6 show a paper machine without a hood. Here all illumination is supplied by two-lamp 40-watt fluorescent units. The units are mounted in semicontinuous rows (8-foot centers in rows), using two rows of lights per machine. Fixtures in the aisle are mounted at an angle in order to provide better vertical illumination on the sides of the machines. Figure 7 shows the calender and reel of this machine. Note that supplemental fluorescent units are employed over this more critical seeing area.

Broke handling in the basement area is shown in Figure 8. Lighting is supplied by two-lamp 40-watt fluorescent units mounted on 10-foot centers with one row on each side of the paper machine mounted on the ceiling. Approximately 10 footcandles is adequate for the efficient handling of this bulky paper.

Calendering

General lighting in the calendering area should provide adequate illumination for the safe and efficient handling of the heavy paper rolls and for the adjustment and service of the calendering machines. Lighting levels in the 50-footcandle range are desirable for efficient operation. The fluorescent type of equipment is most suitable because of the relatively low brightness reflections from the polished rolls and the machine surfaces. The wide distribution of most industrial fluorescent fixtures provides good vertical illumination on the calender.

Stock preparation

Seeing requirements in the refiners and beater areas are usually rather casual. Lighting levels of approximately 30 footcandles are desirable for the inspection and adjustment of the machines. Filament lamps are usually used because of the simplified maintenance as compared to fluorescent installation. One new development in light source, the R-52 self-contained reflector lamp in 500 and 750 watts, is well suited to applications of this type.

Wood room

Good lighting in this type area is needed due to the hazards involved in handling the bulky material and operating the heavy machinery used in these operations. Lighting levels in the 30-50 footcandle range are desirable. The 750-watt R-52 reflector lamp is particularly suitable due to the rapid rate of dirt accumulation in these areas.

Digester room

Modern digester rooms are very similar to control rooms in power plants, etc., and require careful consideration of the lighting installation in order that adequate illumination be provided on instrument panels. Considerable care should be exercised in order to prevent excessive reflections in the glass meter faces. Figure 9 shows a cross section of a panel board with an indicated safe area for the installation of lighting where it will not create annoying reflections. Another important consideration in this type of area is the proper brightness control of the entire seeing environment. This usually is accomplished by the use of light colors of paint throughout the areas. Figure 10 shows a control panel properly color conditioned. Primary ob-

jects of attention are the recorder faces. This is accomplished by having everything else approximately the same brightness.

Color matching

Most accurate representation of color is provided by a light source which does not emphasize or subdue any portion of the spectrum. In other words, a source which has equal amounts of radiation in all colors or portions of the spectrum would be preferred. The recently announced *de luxe cool white* lamps approach this optimum much closer than other light sources and are, therefore, the best lamps available today for viewing of colored materials. This lamp is well adapted to operations where color discrimination, rather than accurate matching, is desired.

Where it is necessary to match two samples, it is desirable to deliberately distort the appearance of the two samples by first lighting them with a source predominantly blue in spectral composition and then lighting them with a source which is predominantly red in spectral composition. If a color match is obtained under these two sources, then the samples will match under any other lighting condition. Some few materials fluoresce when illuminated by ultraviolet radiation. Thus the predominantly blue light should also contain ultraviolet radiation. The source which is predominantly red should not contain ultraviolet. The daylight fluorescent lamp is a logical choice for the bluish component and the reddish component is supplied advantageously by filament lamps.

Difficult seeing tasks

Critical inspection involves in many cases very difficult seeing problems. These problems can be grouped broadly into three main categories. In many cases it is only necessary to supply enough lighting so that the operator can use his visual ability to best advantage, such as that shown in Figures 2 and 3.

For other visual tasks a light source having highly directional characteristics is desirable. Figure 11 shows one example of this technique applied to the inspection of finished paper sheets. Where it is necessary to examine the surface of the paper for small imperfections such as wrinkles, tears, spots, etc., the use of these highly directional sources, in this particular case automotive type fog lamps, provides modeling or three dimensional effect on the small irregularities in the paper surface. The slight shadows cast by these irregularities make the detection of defects very much easier than with ordinary types of lighting.

The fog lamps are particularly suitable for this operation because of the sharp cut-off above horizontal. Here, the operator can work directly facing the units without having high brightnesses directly in his field of view. It is also possible to utilize fluorescent lamps mounted in the same position with a properly designed reflector to give adequate shielding to the operator.

A third type of lighting effect which is sometimes helpful for difficult seeing tasks is the use of a large area, relatively uniform brightness source, usually consisting of a bank of fluorescent lamps behind a diffusing media such as opal glass or plastic. This type of source is particularly suitable for the critical inspection of polished surfaces. A calender roll, for example, can be inspected critically for smoothness of finish if a uniform brightness light source is reflected in the surface of the roll.

A further modification of this technique is the application of some type of definite pattern on this uniform brightness source. Figure 12 illustrates one application of this technique. In this figure a brightness pattern is being reflected in a bearing cap. The pattern is, of course, distorted by the cylindrical surface as would be expected. However, the pattern should be clean and sharply defined, assuming that the surface is optically smooth. In the figure it will be noticed that the reflection is somewhat ragged, indicating undesirable chatter marks. This rough surface is what causes the distortion of the image.

Laboratories

The desired working environment in a laboratory is usually somewhere between that of a general office and a manufacturing area. The efficient and accurate perfomance of the laboratory work requires illumination levels in the 50-100 footcandle range for the general activities throughout the area. Figure 13 shows a well lighted laboratory.

Shipping and receiving

In the shipping and receiving areas, the most difficult visual tasks consist of making out forms, checking labels and stock, packing and wrapping, etc. These areas should be lighted in much the same fashion as the general manufacturing area. A 50-footcandle level supplied by two-lamp fluorescent equipment in continuous rows on 10-foot centers gives uniform lighting, as shown in Figure 8. If the 40-watt fluorescent units are used, these continuous rows on about 10-foot centers will provide 40-50 footcandles, and if 85-watt units are used, comparable lighting will result from rows placed on approximately 13-foot centers.

For the more casual tasks of loading, rough crating, etc., lighting levels of 20-25 footcandles are more typical .These may be obtained by omitting one-half of the reflectors of a continuous row system, and should the area be used later for manufacturing processes, the higher production lighting level is readily obtained by completing the continuous rows through the installation of the remainder of the reflectors and auxiliary equipment.

In many areas of this kind, a service desk is located adjacent to the stock room. A continuous row of two-lamp fluorescent equipment over the length of the counter is quite adequate.

Stock and tool rooms

Lighting requirements in an area of this kind are primarily supplying illumination on the vertical surfaces of the boxes and cartons stored in the bins, or in the case of loose or bulk materials, the adequate illumination of the interior of the bin. In all cases the primary requirement is to supply vertical illumination. One of the better methods of lighting this type of area is by utilizing continuous rows of single lamp fluorescent equipment down each aisle. Figure 14 illustrates a stock room lighted in this manner. It will be noted that the lighting units are mounted in the center of the aisle approximately at the top of the upper bins and that they provide adequate light sideways toward the bins.

Warehouse lighting

There are in general two types of warehousing operations. Active warehousing consists largely of temporary storage of material used in current production or prior to shipping. This requires lighting levels of 15-20 footcandles. One good lighting solution is continuous rows of two-lamp 40-watt or two-lamp 96T12 fluorescent units on approximately 20-foot centers. If the ceiling height is less than approximately 20 feet, the rows should be placed closer together. One arrangement is continuous rows on 10-foot centers omitting half of the units in each row. This permits easy completion of the rows should the area ever be used for manufacturing operations.

The other type of warehousing consists of storing materials that are needed only occasionally. In most cases, the lighting for this service is supplied from filament lamps and the lighting level is of the order of 10 footcandles.

Office areas

As costs of office operation increase, the most efficient utilization of employee capabilities is more and more imperative. In some office areas, such as lobbies and reception centers, where the seeing tasks are relatively casual, lighting levels of the order of 10-20 footcandles are often adequate. On the other hand, office tasks such as bookkeeping, detail drafting, etc. require higher levels of lighting. Here lighting levels of 50-100 footcandles are more desirable. Figure 16 shows a well-lighted plant office.

Loading seed into the hoppers in preparation for seeding operation

Helicopter seeding helps reforest vast areas of logged off land

Helicopter seeding speeds reforestation

G. H. SCHROEDER
Forestry Department
Crown Zellerbach Corp.

▶▶▶ AS THE RESULT OF repeated fires, more than two million acres of forest land in the Douglas fir region are non-stocked or in need of additional stocking. At the curent rate of reforesting, the job of planting this area would take at least 20 to 30 years; and for all forest land needing stocking in this region, half a century would be needed at the current rate of planting.

Aerial seeding is not regarded as the final answer to all reforestation problems, but it is rapidly developing into a useful tool for bringing favorable sites back into production. It offers a feasible means of getting results in the tremendous job of reforestation, especially on inaccessible areas where planting is out of the question. Used judiciously in conjunction with planting, it should allow the Pacific coast to reforest in one-half the time or less the great area of non-stocked or partially stocked forest land now needing attention.

Cost of aerial seeding

Direct seeding is much cheaper than planting. When used with aircraft fitted with proper seed hoppers and seed disseminating apparatus, it becomes a very fast and flexible method of reforestation. Several acres per minute, or 1500 to 2000 acres per day, can be seeded by one helicopter with accurately uniform distribution of tree seed. Estimates lower than $1.00 per acre, exclusive of seed cost, have been made for this type of seeding. Tree seed on a basis of 30,000 to 40,000 viable seed per acre will cost from $2.00 to $10.00 per acre. Total costs, therefore, may be as low as $3.00 per acre or as high as $11.00 or more. Tree planting is estimated from three to seven times as costly as air seeding for a given area.

Speed and flexibility of operations are just as important as cost. With effective air seeding, an entire area needing reforestation may be put back into production within a short time and cut-over area can be kept in production without a lapse of time due to poor seed years or pressure of rodent populations on natural seed sources. Some 15,000 to 20,000 acres figured in the experimental helicopter work in the Douglas fir region this year.

Consider the weather

Weather is a hazard in several ways: it affects flying, it affects rodent control, and, most important of all, it influences germination of seed as well as the survival and growth of germinated seedlings. Proper seed placement requires a uniformly slow flying speed at a fairly constant height above the surface of the ground with a flight pattern that covers all the area. Weather conditions, especially wind, can make this type of operation impractical.

Rain is a crucial consideration in that it may render rodent control operations valueless due to the use of water soluble poison. Heat and drought are serious, since the survival of seedlings in all but the most favorable locations may be made impossible by critical temperatures. Drought will destroy some seedlings, and in certain locations may preclude aerial seeding in all but the most favorable years.

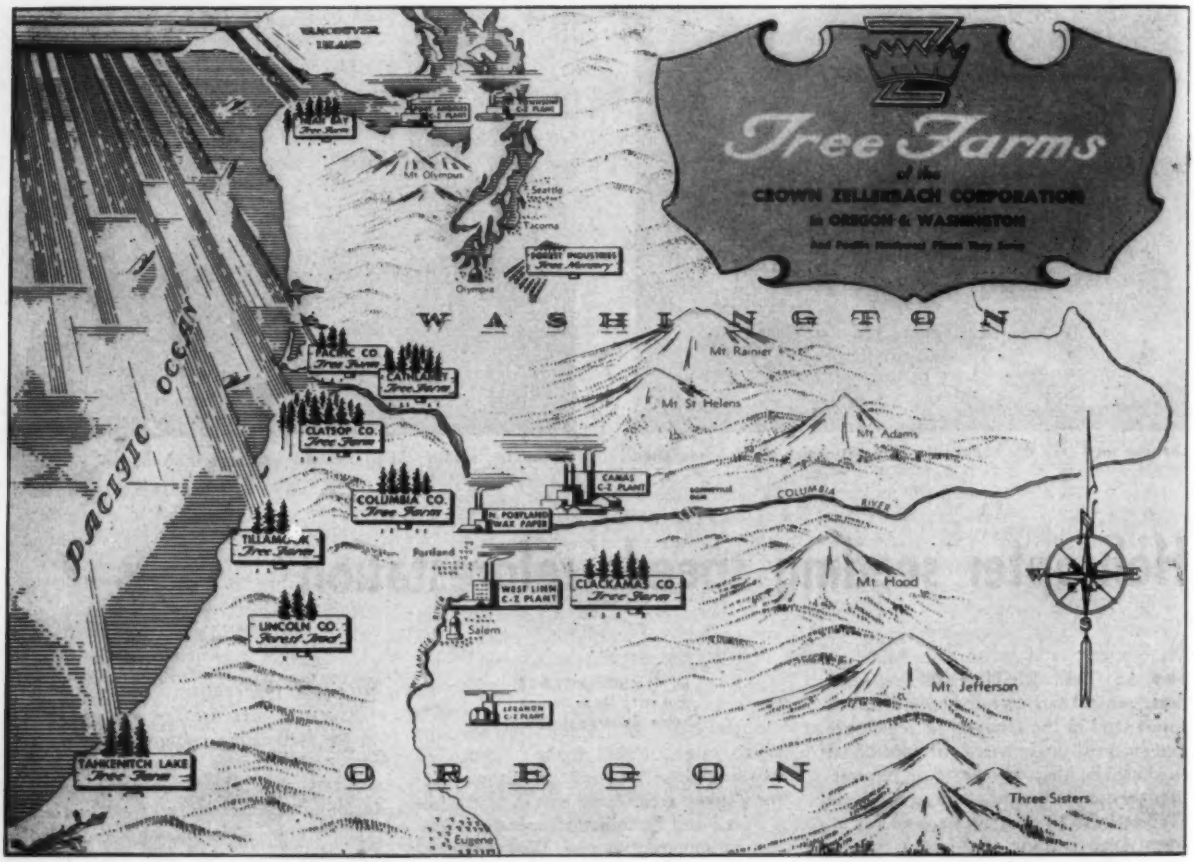
Mice eat the seeds

Research over the last twenty years on the seed-eating mammals of the Pacific states (shrews and mice) has conclusively shown they are an important factor in regeneration of forests in this region. One white-footed mouse will consume more than 200 Douglas fir seeds per day if other food is lacking. In terms of one winter's consumption, this amounts to about one pound of Douglas fir seed during the period of time seed is on the ground before it germinates. Moreover, considerable seed above the rodents' needs may be collected and buried.

Topography and cover

Unfavorable sites due to competition from vegetative cover, exposure and soil conditions might well be avoided. Herbaceous vegetation may be beneficial in that it furnishes shade to eliminate critical temperatures, checks erosion and holds moisture. Eventually it may build up a mat of material through which it is impossible for seed to work its way to mineral soil and for the rootlets of the seedlings to push their way. Various shrubs also furnish competition and may take over the area in such a manner that reforestation is difficult. Annual leaffall may flatten and smother the tiny trees.

Exposure to direct sunlight on south and west slopes results in high temperatures and low moisture content of the soil. In Oregon and Washington, therefore, such slopes are apt to be difficult to seed unless shaded and abnormally moist. The more nearly the slope of the ground is at right angles to the sun's



rays during the heat of the day, the more difficult the site; slopes exposed to prevailing winds may be drier and more difficult than those not so exposed, and east slopes may be unfavorable because of killing by early morning sun in frost critical areas.

Soil conditions may make an area unfavorable for direct seeding. For instance, the first year after a heavy burn the color of the soil might be so dark that heat absorbed will raise the temperature to the critical point.

Planning the project

In choosing an area or areas for air seeding, several administrative factors must be considered. Size is important, since the larger the area the less expensive wil be the flying costs, other things being equal. Shape is also important, since irregular areas are more difficult, a problem to mark the boundaries for, and are more costly to fly.

Favorable exposures should require less seed, and topography will affect the evenness of seed and bait dissemination, since the tendency is to fly at the same elevation. Vegetation may require the use of pellets instead of bare seed, the greater weight of the pellets being necessary to make certain that seed does not "hang up" before reaching the ground surface.

If vegetation and shade are insufficient on areas recently burned, it may not be feasible to seed until one growing season or more has built up live shade to reduce surface temperatures and increase moisture in the upper soil surface, while at the other extreme it may be necessary to burn accumulations of dead material a year or so beforehand in order to have a suitable seed bed when the air seeding is done.

Source of the seed is of utmost importance, and every effort should be made to secure seed from a climate and soil comparable to that where it is to be sown. Small-seeded species seem favorable for use in the seeding, because (1) the same number of viable seed will usually cost less, and (2) rodents are less likely to find the seeds sown. A mixture of species seems the most desirable, since different conditions react differently on the same species. Failure of one species, moreover, is not so disastrous if other species grow; and a mixed forest is less liable to loss from insect or disease attack.

Helicopter seeding operations were directed by Crown Zellerbach's own forestry department. But the actual flying operations were handled by Helicopters Inc., of Seattle, using Bell Aircraft Corp. helicopters.

Although the initial work in air seeding was done with fixed-wing aircraft, it seems generally agreed that use of the helicopter has the advantages of more even dissemination of seed, operation at slower speed, and elimination of flying time to and from a flight strip, since hoppers can be refilled and tanks refueled in almost any clear space on the project area.

The helicopter can operate at (1) constant ground speed regardless of rough terrain, (2) safe low altitude at 45 to 60 mph and (3) with the ability to land in small spaces. Ships usually fly at about 200 ft. above ground level. Uniform speed is necessary, since the rate of flow from the disseminating tubes is adjusted to the speed, width of swath, and desired seed weight per acre to give an even spread on the ground.

Before starting a project, a good planimetric map showing all identifying local features should be furnished the pilot for study. Someone familiar with the area or areas can fly with him to point out the local landmarks on the map as they fly over them, and in addition, the areas must be well marked on the ground.

Squares of tar paper, with orange squares painted in the center, tacked to the sides and tops of large stumps or trees or weighted down with heavy objects on open slopes are very good markers. They should be visible from a distance as well as from directly overhead. One marker per quarter mile and at each corner of the seeding area is desirable. Guide flags on a prominent ridge located equidistant apart aid in the maintenance of uniform swath width. Such flags may be taken down as the helicopter goes over them. A pick-up truck on a road stopping at pre-marked equidistant points will serve the same purpose.

Before the helicopter starts a given project, the dissemination device should be tested both by output while on the ground and by careful measurement of width of strip and grains of bait or forest seed per milacre. The end of a blacktopped airport runway furnishes an ideal place for such a check. Headphones connected to a sounding wire in the spreader tubes should be used by the pilot so he will know when the flow of seed stops for any reason.

Measurement of results on large areas is a problem for the first several years. Seedlings are so tiny and so easily hidden by vegetation and brush that sufficient time for measuring results in order to have statistically accurate data is rarely available. An indication, however, of germination and first year survival should certainly be secured by sampling to the intensity allowed by time available.

The difficulty of finding seedlings is shown by data on an area hand seeded to a mixture which contained Port Orford white-cedar far from a white-cedar source. The germination count the first year showed 200 white-cedar per acre; the survival check a year later showed 460 white-cedar per acre; and a survival check four years after seeding resulted in a figure of 900 white-cedar per acre.

During the few years of experimentation in direct seeding carried on since the end of the last war, definite progress appears to have been made. Two large companies and the State Forestry Department of Oregon have projects behind them on which all tests show effective rodent control. At least two companies owning helicopters have worked out procedures for accurate dissemination of seed and/or bait over rough and very difficult seeding areas. The State Forestry Department has carefully studied results on experiments carried on and has published data on one of the seeding experiments that show an average stocking on the entire area of 335 trees per acre, and on favorable exposures and ground conditions of up to 1500 trees per acre.

Full stocking on all areas within a given project will seldom be secured. Some projects will fail because of poor rodent contro or because they are too difficult for methods used. Tree planting will be required to finish the reforestation job on many air-seeding areas. However, the cost for aerial stocking should compare favorably with costs of planting trees. Foresters can hardly afford not to use helicopter rodent control on large, inadequately stocked areas that have seed source. If there is no seed source, but a favorable balance of mineral soil, shade, ground moisture and other items, an investment of $2.00 to $10.00 per acre for high quality seed may well be in order.

Better V-belt drives for less money

F. J. DONAHUE
Application Engineer
Allis-Chalmers Mfg. Co.

▶▶▶ IT IS OFTEN possible to figure a drive which is much better, and, surprisingly less expensive, than another for the same job. In other words, a first solution of a drive problem is not always the best, and frequently this can be improved by study and calculation. Basically, however, there is one consideration which is the key to most such improved drives. That is the matter of small sheave pitch diameter.

Flexing a rubber V-belt around a too-small pitch diameter sheave will cause excessive heating, rapid wear and early failure of the belt. Certain pitch diameters long have been recognized by the V-belt drive industry as minimums below which it is unwise to go. These minimum pitch diameters are as follows:

	Inches		Inches
A belts	3.0	C belts	9.0
B belts	5.4	D belts	13.0
E belts			21.6 inches

Further in this regard, a study of V-belt rating tables will demonstrate that the use of small diameter sheaves penalizes a drive in two ways: *First*, for a given rpm, the smaller sheaves produce a lower belt speed, consequently, a lower horsepower rating; *second*, for a given belt speed, the smaller sheave produces a lower horsepower rating than a larger sheave at the same belt speed. Continuing to study the belt rating tables, it also will be noted that on small diameter sheaves, there is a further penalty suffered; namely, at higher belt speeds no ratings are shown. Thus, one is subtly discouraged from using very small diameter sheaves at higher speeds. This merely reflects the fact that harmful as it is to operate very small diameter sheaves, at moderate speeds, it becomes rapidly more harmful at higher speeds.

Case 1

To illustrate these points in a practical way, we shall review two quite dissimilar problems from the standpoint of a run-of-the-mill, perfunctory solution and then from the standpoint of a more careful, considered approach deliberately avoiding too-small diameter sheaves in relation to the belt section used:

Required a V-belt drive from a 15 hp. normal torque motor at 1750 rpm to a centrifugal blower at 1272 rpm. The ratio is between 1.37 and 1.38. Without much thought, the following drive with stock sheaves and belts would probably be quoted: *Catalogue 6-B46-5.4-7.4 center distance 13.5 in.** According to this recent manufacturer's catalogue, this drive would have a total rating of 18.2 hp. and cost the user $40.48 net. Now, if we could improve the small sheave pitch diameter it would improve the drive. From the same manufacturer's catalogue, we could work out a stock drive for practically the same ratio such as *Catalogue 5-B55-6.8-9.4 center distance 15.4 in.* This drive would be substantially better than the other. It would have a total rating of 22 hp. and cost the user only $36.81 net. Thus, by using larger sheaves we save one belt, one groove on each sheave and still provide a larger horsepower capacity at a price some 10

(*) This abbreviated system of describing V-belt drives is used by all V-belt drive manufacturers. For those unfamiliar with the abbreviation, *Catalogue 6-B46-5.4-7.4 center distance 13.5 in.* means a drive consisting of six belts of B section about 46 inches long, one six groove sheave of 5.4 inch pitch diameter and one six groove sheave of 7.4 inch pitch diameter. Distance between sheaves is 13.5 inches.

per cent lower than the drive using the smaller diameter sheaves.

Case 2

Required a V-belt drive to operate from a 100 hp. wound rotor motor at 870 rpm to a centrifugal pump at 1600 rpm. From observation, we know that some would feel compelled to use D section belts in this drive in view of the horsepower requirements of the job. However, in their well-intentioned and quite justified avoidance of belt speeds much beyond 5000 fpm, they would quote something like the following drive: *Catalogue 12-D173-22.0-12.0 in. center distance 60.7 in.* It will be found that the 12.0 inch sheave was selected because it was the largest that could be used without considerably exceeding 5000 fpm belt speed. Actually it produces 5040 fpm. The rating table for D section belts shows no ratings for a 12.0 inch diameter sheave beyond 3800 fpm indicating quite definitely the undesirability of operating D belts on a 12.0 inch sheave beyond 3800 fpm. This drive would cost a user $636.84 net.

Studying such a drive with an eye to bettering it, the 12.0 inch sheave would claim our attention at once. It is a full inch smaller than the minimum generally regarded as acceptable. Yet, to select a larger sheave would be to err in the other direction; i.e., excessive belt speed. The solution is really simple. Why not retain the present sheave diameters but go to the next smaller belt section, namely "C" section, for which the 12.0 inch diameter is generous and comfortable. This would give us a far superior drive from several standpoints: *Catalogue 11-C173-22.0-12.0 in. center distance 60.5 in.* which would cost the user $283.03 net, at a saving of over $250.00 or nearly 40 per cent. The face width of the 12-D groove sheaves would be 17-9/16 inches compared with the 11-C groove sheaves whose face width would be 11⅜ inches or a saving in face width of over 6 inches. Frequently, compactness such as this is highly important, especially when the installation is to be made in an old plant.

These advantages are enough alone, but consider another reason for going to a smaller belt. Assuming the correct theoretical tension on a D belt to be 230 pounds, and that for the C belt to be 125 pounds, the 12-D belt drive would require 2760-pound tension between shafts and the 11-C belt drive would require only 1375 pounds. The advantages of lower bearing pressures need no explaining.

These examples are given to emphasize the need of using care in selecting drives. The convenient tables worked out for the catalogues cannot take all factors into consideration. That is left to the engineer.

South African mill makes suitcase board

HANS BAARS
Celdecor Africa (Pty.) Ltd.

▶▶▶ ITS FIRST LOT of suitcase board was supplied to a customer in Johannesburg, in October, 1950, by the Boksburg, Transvaal factory of Trans-African Paper Products (Pty.) Ltd.

Initial capacity of the mill amounts to 100 tons of board per month. The production program will include fiberboard of various qualities to be used by the manufacturers of suitcases, shoes, motor cars, stationery, electrical equipment, etc.

Buildings were specially designed to suit the process. They are spacious, with plenty of windows. At night, lighting is by fluorescent units. A continuous production flow is maintained by careful placement of all processes, and the finished board is weighed and loaded at easily accessible loading points.

The stock preparation used is classical. The machines, however, are of the most modern design. Locally collected wastepaper and imported pulp are used as raw materials. They are first repulped in a heavy kollergang. The pulp is then passed over a vibrating screen, and dropped into trucks. The trucks are lifted over one of the two Fuellner type beaters and emptied into them.

After beating, sizing, and dyeing are completed, the stock is conveyed into one or both bucket wheel chests by a high density Egger pump, made under license in the Union of South Africa. The bucket wheels deliver the stock into a launder, in which proper dilution takes place, so that the pulp can be screened through a Lamort strainer, after having passed a simple sand trap.

The board machine was supplied by Maule & Cie., Turin, Italy. It is a two-vat unit with a streamlined inlet which gives a quiet and steady flow to the small pan from which the stock flows on the drum. The very even mat of fibers is couched off by a felt which passes a suction box before the wet sheet is rolled on a heavy couch drum until the required thickness is obtained. The large wet boards are taken from the drum by slitting through along the width and pulling them onto an adjoining table. Stacks of the wet boards are made, with sheets of cloth between the boards to prevent them from sticking together when placed under an 800-ton press, which was also made in the Union of South Africa. After the pressing process, the boards are dried until air dry.

The boards are then passed through machines to give them the required finish. For glazing and also for calibrating, a heavy Kleinewefer two-roll calender is used. In making suitcase board, a special resistant coating in a variety of colors is applied. This is done on a roller coating machine, connected with an Infrarot drying machine, which dries the layer of coating in a matter of seconds. Other machines for embossing, cutting, damping, etc., were largely supplied by Carcano Gerolamo Bros., Maslianico, Italy.

A Sveen-Pedersen save-all was installed for the treatment of white water from the board machine. All solid matter is recovered, so that the water discharged from the save-all is used not only for dilution but also for the high pressure sprays of the board machine. Consequently, the water system of the mill is practically closed.

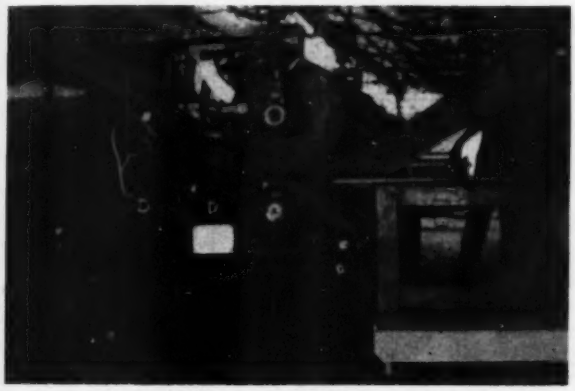
Thanks to careful planning by the consulting engineers, Messrs. Celdecor Africa (Pty.) Ltd., all machinery and equipment was delivered from the various overseas and local suppliers in plenty of time for the scheduled opening of the factory. The first sheet of board manufactured proved to be salable. So this mill has found a ready South African market for its products. Within a few days, the total output for the rest of 1950 was sold to various customers. The quality of the board made is considered to be up to import standards, and many tons of it have already been converted into suitcases which are now traveling throughout the Union of South Africa, the Rhodesias, and even in Belgian Congo.

After the successful starting up of the mill under their supervision, Messrs. Celdecor were appointed managing agents for the mill.

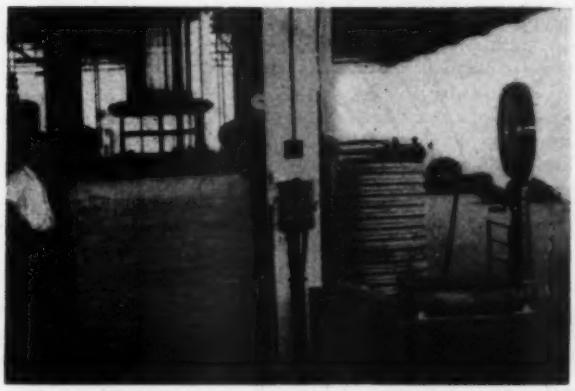
In the first two weeks of operation, the operators were satisfied that the mill will have a solid position in African industry and trade. Further expansion already can be predicted. Ample space has been provided in the existing building for a second machine, construction of which is expected to begin early in 1951.

1 Kollerganged stock is charged to one of the two Fuellner beaters

2 Two-cylinder board machine preceded by a Lamort screen. Note Sveen-Pederson save-all above bucket wheel chests at rear



3 The wet sheet is built up on a couch drum and is taken off when proper thickness is reached



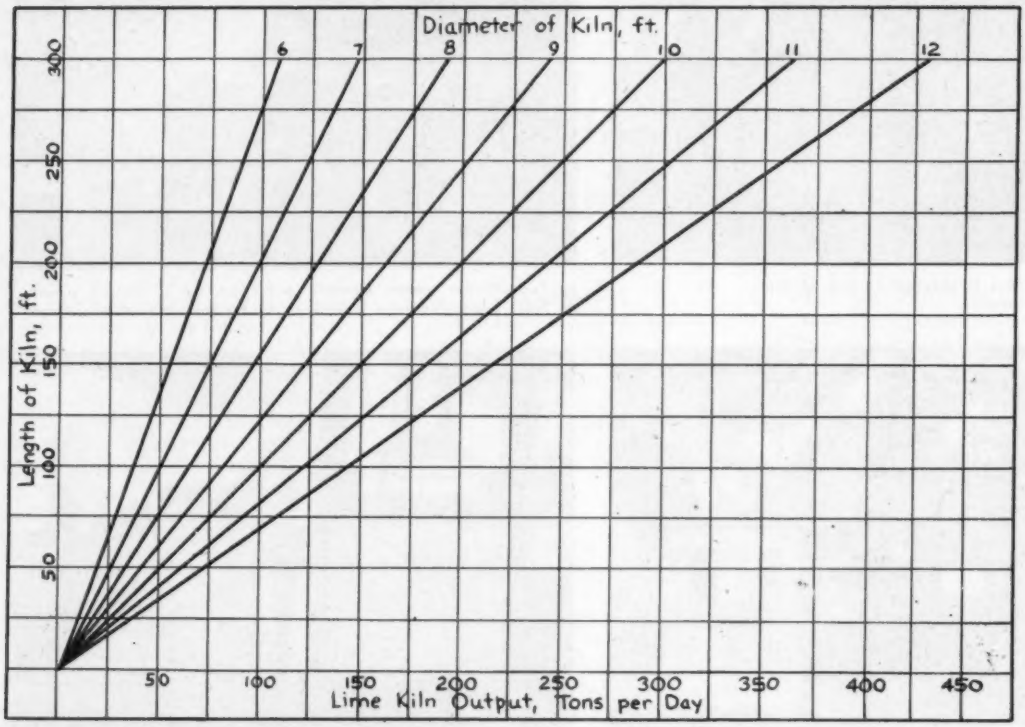
4 Stacks of wet sheets separated by cloth are pressed in an 800-ton hydraulic press

5 Nitro-cellulose is applied to air-dried board on a roller coater.

6 Infrared dryer with suction unit dries the coated board

7 Coated suitcase board from the infrared dryer is stacked on a layboy

8 Two roll calender for glazing and finishing the coated board



This chart will help answer the question . . . . .

Is your lime kiln stealing profits?

RALPH GIBBS
Consulting Chemical Engineer

▶▶▶ FOR ALL PRACTICAL purposes, the lime recovery plant in the average kraft pulp mill seems to be considered a foster child rather than a blood member of the family. More often than not, the lime recovery kiln is placed in the hands of the pulp mill superintendent, who must assume the responsibility of managing a unit, the engineering principles of which might be extremely vague or totally obscure.

At this point the writer wishes to offer those pulp mill superintendents operating lime recovery plants a consoling word. It is this: *At the present time there is no generally recognized method, or system, that is considered best with regard to the over-all operation of rotary kilns.* This holds true not only in the lime recovery plant of the paper mill, but in all other industries using the rotary kiln.

Most industrial processes are highly standardized. But the rotary kilns seem to have avoided any such state of standardization. Most industrial processes have been accorded intense scientific study, and their technical features are well established and revealed in publications either in the form of textbooks, technical articles, or the patent literature. Few publications appear on the technical features of the rotary kiln. Beyond the works of a few individuals, there has been no concerted effort to establish optimum operating conditions for this indispensable industrial tool.

So the pulp mill superintendent cannot be censured too harshly if he doesn't know everything about the rotary kiln in his lime recovery plant. But he should at least know what his kiln is capable of doing in the way of production.

What is your kiln's capacity?

Each rotary kiln has a potential productive capacity that will depend largely upon its physical dimensions. Although there are modifying elements, the basic productive capacity will be fixed by the kiln's physical dimensions. The empirical relation for optimum kiln production was developed by the writer many years ago, and is shown in the graph. It is $T_a = (k\ D^2\ L)/100$, and it holds just as well today as it did when it was developed.

T_a is the daily production of lime, in tons
D is the kiln shell diameter, in feet
L is the kiln shell length, in feet
k is the production coefficient, its value fixed by various items attending the kiln operation. For conditions normally associated with the lime-recovery plant, the value of k will be 1.0

If you want to lose money in your lime recovery plant, don't pay too much attention to this graph. It might make you feel bad when you learn that your 8 ft. diameter by 150 ft. long kiln, which is producing 60 tons of recovered lime per day, should be producing 95 or 96 tons per day. Or it might make someone look foolish if your requirements are only 60 tons per day and a kiln so grossly oversized was bought. The capital investment, in such a case, was far greater than it should have been.

Check kiln performance

But should you be genuinely interested in the potential production capacity of your lime recovery kiln, check your actual performances against this chart. If you don't equal or better the figure indicated by the chart, it will pay you well to investigate your kiln operation. *This is especially true if you need the additional tonnage.*

Check the quality of the feed; moisture under 55 per cent; less than 1 per

This is the final article of a series written by the late Mr. Gibbs for *The Paper Industry*. It was completed shortly before his death last October.

The complete series, as published, includes six articles:

Fundamentals of lime kiln thermodynamics ..... **Dec., 1949, pp. 1070-1073**
Development and transfer of heat in rotary kilns ..... **April, 1950, pp. 54-62**
Fundamentals of lime kiln thermodynamics ..... **August, 1950, pp. 501-504**
Economics and thermodynamics determine optimum kiln size ..... **Oct., 1950, pp. 731-732**
How to determine the economical length of the rotary kiln ..... **Jan., 1951, pp. 1084-1085**
Is your lime kiln stealing profits? ..... **Feb., 1951**

In addition to the above listed articles, the author also prepared a comprehensive paper which was read posthumously at the TAPPI Alkaline Pulping Conference held at Jacksonville, Fla., Oct. 25-27, 1950.

cent of caustic soda. Check the quantity of feed; adequate to load the kiln properly; synchronized with the kiln speed. Look carefully into downtime and its causes; keep to a minimum.

Don't burn the lime harder than necessary. Check into heat exchange devices at the feed and discharge ends of the kiln.

Have balanced combustion at all times. Don't overfire or underfire fuel. Maintain proper draft. Restrict flow of material at discharge end. Reduce heat losses through kiln shell.

These items, seemingly insignificant, are of the utmost importance to attaining maximum production from the kiln.

Fuel economy is important

Although the best possible fuel economy can be realized only when the kiln is properly sized for the desired production rate under prevailing economic conditions, a great deal can be done to keep the heat requirement per ton of lime to a minimum for any size of kiln. It is only in exceptional cases when the heat requirement need exceed 10 million Btu's per ton of lime.

But if you want to waste money in your lime recovery plant, don't pay any attention to these figures. Just be satisfied to coast along on your 14 to 16 million Btu's per ton of lime. You will have lots of company at these figures. You won't be too far off the average.

If it does happen that you are taking seriously this matter of heat requirement, and if you are curious about attaining the best values your system is capable of operating under, there are a couple of things you can check into. The physical proportions of the kiln are extremely important. Although a kiln may be too long for a specific set of conditions, it is also possible to have a kiln too short. The kiln may be too large in every way for the job to be done. Under these conditions it becomes necessary to modify the system as it exists to something more favorable. Check into thicker kiln linings, chain sections, kiln shell insulation, pressure drops through the kiln (draft), downtime, constancy of the kiln feed quantity and quality, fuel quality, and kiln loading. Recover as much heat as possible from the discharged lime. Operate with balanced combustion.

These items have been discussed in detail by the writer in articles, some of which have appeared in this journal. But it is almost impossible to make this information become a comprehensive and co-ordinated technique in the mind of the reader without considerable study and application. It cannot be absorbed, or acquired, by a casual reading just before you have your after-dinner nap in your favorite morris chair. It doesn't become a part of you simply by exposure, like the measles or chicken pox. This is something you have to work for, and it requires time.

Modern business methods demand efficient operation of the organization's components. Each unit must justify its economic existence by returning a profit on the investment. And it is wise management that perpetually seeks ways and means of reducing costs.

Actually, the lime recovery plant can be made to pay its own way handsomely if it is given the attention and care it deserves.

It's worth management's attention

Under a complacent management, the lime recovery plant can suffer many afflictions. These may range from complete disinterest to zealous but incompetent attention. These troubles may be concealed by a system of accounting that fails to reveal them, or they may be condoned by a paternal attitude of management.

It isn't at all necessary for top management to go into all the technical details of lime recovery, and lime recovery kiln operations; but an alert and enterprising top management will know what its lime recovery plant is capable of producing, what the cost of production should be, and how to make every effort to attain these objectives. Alibis and excuses for shortcomings of the lime recovery plant will not be satisfactory.

From the graph, any person can determine for himself what the lime recovery rotary kilns are capable of producing. And if the heat requirement is greater than 10 million Btu's per ton of lime produced, then good money is being wasted.

Give the supervisor of the lime recovery plant every help and opportunity to attain these objectives. And if he needs technical assistance in the way of professional counsel, see that he gets this, too; he will be more valuable to you for it.

A paper mill accounts for its selling costs*

IRVING C. BARNES
Strathmore Paper Co.

▶▶▶ THIS ARTICLE describes a plan of sales or distribution cost accounting developed by the sales research department of a hypothetical concern, the XYZ Paper Co. During the years that production was speeded up to supply the needs of rapidly growing markets, major problems in factory cost accounting were met and solved. Not so the problems of distribution cost accounting. However, with increased competition came the realization that there was a great need for the control of these expenses. As sales volume drops, extra effort to get orders naturally increases the unit selling cost and executives begin to look for a method of analyzing and reducing the component items.

The control of field selling expense is greatly different from the control of variables in factory costs. It is a cost, however, which affects materially the volume of business obtained and properly receives considerable and continuous attention. It is not practical to set an exact task for any one day which might be picked out. Yet by careful study, an average task per day ap-

(*) Reprinted from the July, 1950, issue of the *N.A.C.A. Bulletin*, published by the National Association of Cost Accountants. The author is head of the Cost and Statistical Department, Strathmore Paper Co., West Springfield, Mass., and has been connected with this company since 1920, following initial experience in banking.

plicable to field sales personnel may be developed over a period of time. Standard costs of these average tasks can be determined and variations from standard may be controlled.

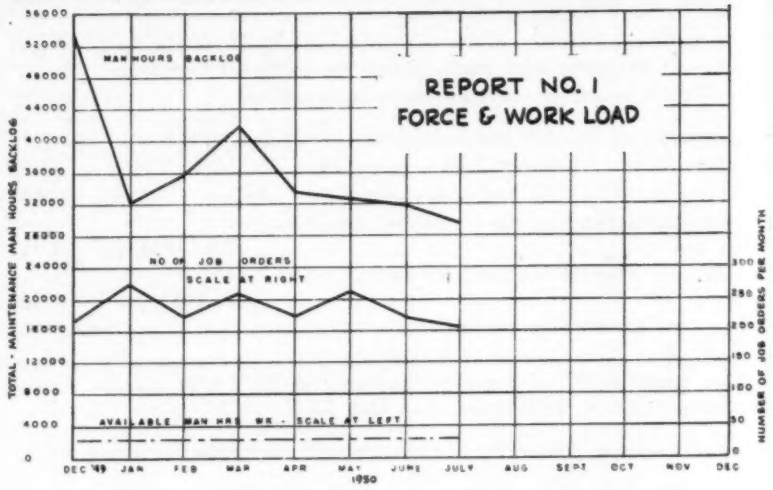
In the XYZ Paper Co., a sales plan is carefully worked up in October and November for the succeeding year. The volume of business expected is determined and used to set up the production schedules of the mills. Since the sales plan is made up by lines and territories, salesmen's schedules, as well, can be (and are) made up from it. These schedules then become the volume budget for the year, subject to revision each period as the requirements of each territory may demand. However, it is not volume alone which is scheduled. As indicated in the preceding paragraph, the objective is to set task for the sales force and to record, accumulate, study and fairly interpret variances. In the sections of the article which immediately follow, the principal forms employed in this process are described.

Field selling control—introducing the "Seven Sisters"

In all, the company has seven basic forms for accumulating and reporting sales and information related to selling costs. The battery of information starts with a quartet of four-week period reports. In Figure 1, Record of Calls on Customers, is shown the method used to accumulate the budgeted and actual calls made both in cities and by salesmen. This is posted by periods from reports received daily from men in the field. It displays budgeted and actual calls for each period and in total. In its essence, this is a backbone record related to the salesman's use of his time, although it does not indicate degree of thoroughness in calls represented. The dollars of outlay incurred by the salesman come to the fore in Figure 4, Days Travelled and Field Selling Expense. This is used to show the budgeted and actual expense of field selling. The budget is set up by pricing the number of days scheduled in Figure 1. Standard allowances are used for hotels, meals and entertainment. Actual railroad or air line fares are determined for the various cities in which the men are scheduled to make calls. If a salesman uses his own automobile, the budget is set by estimating the miles to be traveled, at a standard allowannce per mile.

Figure 2, Report of Sales Activity and Results, is also a four week period report summarizing in its upper portion the calls made and the sales activity of each territory and, in its lower portion, showing sales results in dollars for the period and cumulatively, together with placement or withdrawal of lines. In this report calls made to merchants are separated from those made to merchants' customers. The figures related to particular lines are supported by detail reports which show lines changes by cities. New lines are thus followed up and properly distributed in each territory. The relationship of sales results and selling expense is the point of the Figure 3, Sales and Sales Expense by Territories. Like the others, this is a four week report. In it sales are accumulated as in Figure 2. The expense section is totaled from Figure 4. Administrative

(Article is continued with illustrations on pages 1203 and 1204.)


REPORT NO. 1
FORCE & WORK LOAD
MAN HOURS BACKLOG
NO OF JOB ORDERS
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AVAILABLE MAN HRS WK - SCALE AT LEFT
TOTAL - MAINTENANCE MAN HOURS BACKLOG
NUMBER OF JOB ORDERS PER MONTH
DEC '49 JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1950

Maintenance reports

Charts and graphs provide a basis for management to measure the effectiveness of the mill maintenance program

C. C. WINSTON
Senior Staff Engineer
Wallace Clark & Co., Inc.

▶▶▶ THERE SEEMS TO BE no single set of figures which can be used to judge the effectiveness of the maintenance effort. If service is the only measure, enlargement of force would provide a remedy. But *for low cost maintenance there must be a task for each man, each hour of the day.*

If cost alone is considered, any maintenance department can make a favorable showing over a short period of time, merely by not doing any maintenance. The results here, if viewed from the cost angle alone, would be very satisfactory, but the unscheduled interruptions to production and consequent delayed shipments would finally put the company out of business.

On the other hand, if only the downtime through breakdowns is considered, the maintenance department could minimize these and make a favorable showing, but the cost might be out of all proportion to the gains.

The maintenance superintendent could easily protect himself against any equipment breakdowns by having an entire *spare plant* in his stores room. This would prove uneconomical from a space standpoint and would tie up a prohibitive dollar amount in inventory. In order to hold his stores inventory within proper controls he must take a calculated risk and base his stock levels on anticipated usage.

As maintenance expense is usually a sizable part of the total operating expense, maintenance must be budgeted so that a company can predict its cash position. If properly prepared this budget serves as a good measure of maintenance performance.

Good maintenance management must keep all of these balls in the air at the same time. If any one is dropped, maintenance costs increase.

The following series of charts, from an actual installation, shows that good over-all balance and control have been achieved and are being maintained two years after completion of an installation in a newsprint mill.

Report No. 1— Force and work load

The Load Chart, presented in a previous article, affords an excellent presentation of this condition. Another type of chart shows this same information for a longer period of time by consolidating the work load into one figure and comparing this with the man-hours available in the total maintenance force. The number of Job Orders issued each month may also be shown, as this is a fair measure of maintenance department activity over a long period of time. On the chart it may be noted that the work load has varied from month to month, but has required no additions in total work force.

Report No. 2— Per cent of planned work

This chart proves valuable in measuring the effectiveness of the inspections and preventive maintenance by showing the percentage of man-hours expended

on planned jobs as compared with the total man-hours for planned jobs and breakdowns. As shown on the chart, the percentage of planned work dropped off during April and May, but is now about 70 per cent, which is the normal optimum for this type of operation.

Report No. 3—
Equipment downtime

This chart covers equipment downtime due to unscheduled interruptions for mechanical or electrical reasons. This information may be expressed in minutes or hours per month, or if the cost information is available, in terms of sales dollars not realized. Note on the chart that equipment downtime as measured in total minutes per month for each of two large paper machines, shows a gratifying reduction below the 1949 average, which was in turn only 60 per cent of the 1948 average. This shows that the preventative work, inspections and lubrications are forestalling major break-downs and costly interruptions to production.

Report No. 4—
Stores inventories

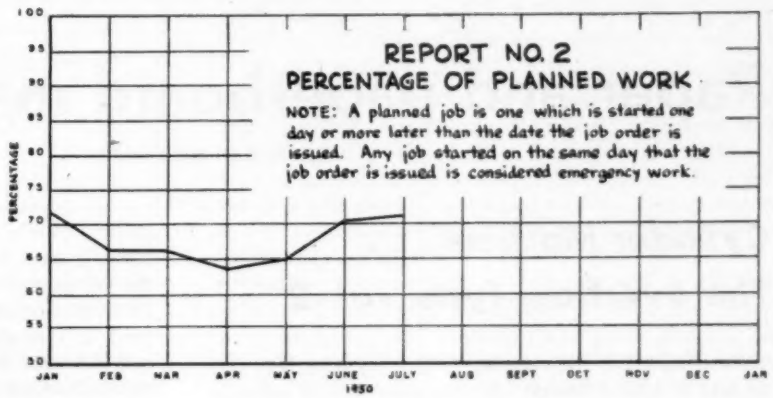
Once the Order Quantities have been established for each of the items to be carried in stores, a theoretical dollar value can be calculated. Comparison of actual investment in stores against theoretical dollar values gives the maintenance department an answer to the often repeated accusation that the investment in stores inventory is too high. On the chart it can be seen that the stores inventories are gradually decreasing. This is due to more accurate ordering in light of established order points and order quantities, and disposal of obsolete items.

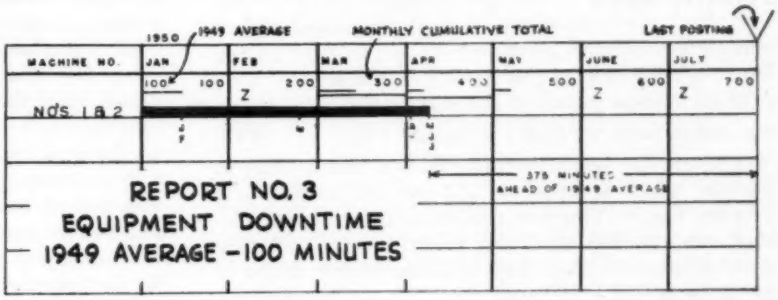
Report No. 5—
Maintenance budget

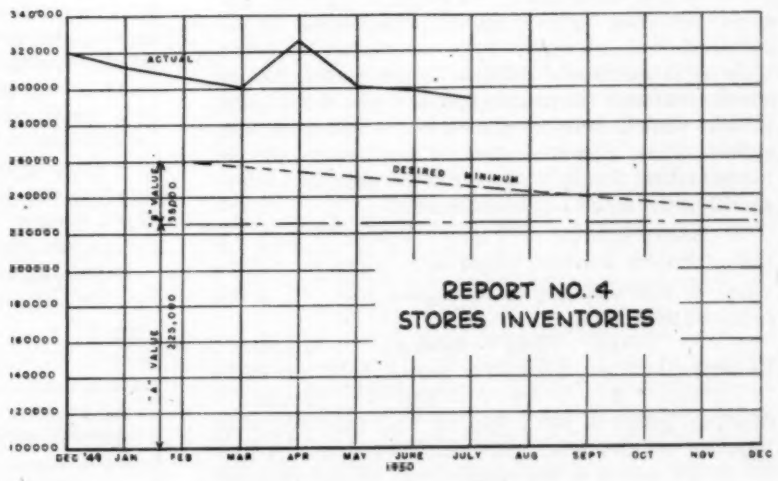
If comprehensive maintenance budgets are in use, a graphical comparison of actual maintenance cost versus budget by month and year, to date, provides a good control measure.

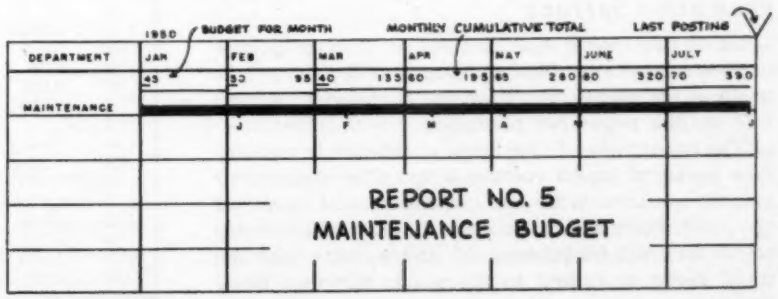
Note that the total maintenance expense ran slightly ahead of the budget for the first four months, but control was again established in May and by the end of July expenses were within the budget.

Executive reports similar to these show management what results they are getting for their maintenance dollar. Of equal importance, they provide continuing "top level" interest in maintenance. Their preparation each month insures that the system aspects of maintenance management are in a current condition. This guarantees perpetuation of methods and constant emphasis on improvement.









Paper and paperboard making—XII

HARRY WILLIAMSON

Cylinder Machine . . . The overflow type vat-2

THEORETICALLY, the velocity (V) or speed in feet per second of a fluid flowing through an orifice in the side or bottom of a vessel is equal to that acquired by a body falling freely in vacuum through a height equal to the head or depth, measured in feet vertically from the level surface of the fluid in the vessel to the center of gravity of the orifice.

Velocity head

If we become technical and reduce this to a mathematical formula we have: V equals $\sqrt{2gh}$, $= \sqrt{64.4h}$, $= 8.03\sqrt{h}$. (g) being the velocity of a falling body in vacuum which is equal to 32.2 feet per second, and (h) the height. This law applies equally to all fluids; thus, theoretically, mercury, water, air, etc., all flow with equal velocities from a given orifice under a given head.

Table 1 shows columnized data pertaining to computation of velocity flow from one inch HEAD HEIGHT to 20 inches; these are the brackets of cylinder machine operation at the speeds of operation so far achieved.

As it is extremely difficult, if not impossible, to check accurately the head height or depth of the liquid volume while a cylinder machine is in operation, this author offers a continuation of application of the mathematical formula which can be used by simply checking the speed of the machine:

If velocity is equal to $\sqrt{2gh} = \sqrt{64.4h} = 8.03\sqrt{h}$ then a known machine speed in feet per second divided by 8.03 will give us the square root, $\sqrt{h}$ of the required HEAD HEIGHT.

Example:	Head *(inches)*	Head *(feet)*	Velocity *(ft. per sec.)*	Velocity *(ft. per min.)*
	6	0.5	5.67	340.2

Machine speed is 340.2 fpm, or 5.67 fps—height of required velocity head unknown. Divide 5.67 by 8.03 = .70612 which is the square root of the required 'head.'

Formation Surface

Using two molds, one 36 and the other 60 inches in diameter, as examples, we must first decide on how much of the actual circumference of the mold is used to form the paper per revolution.

The importance of this figure in relation to velocity flow speed of liquid volume is too often ignored or simply confused with the circumferential speed of the mold. For instance, we casually quote the velocity of the flow will be between 0.2 and equality with the mold speed according to the grade of paper being made. While this statement may quite possibly be literally true, it *does not convey* a true relationship of the velocity of flow in relation to the ACTUAL FORMATION AREA in *time* units. When effective force is measured in operable time units of fractions of seconds, and seconds the difference between using the total circumference of a revolving cylinder mold instead of two thirds, slightly more or less according to the freeness or slowness of the stock used, makes quite a difference in an understanding of *what is actually taking place.*

In cylinder machine operation it is also well to remember that the actual head height used as the weight flow force resulting in the factor of velocity is measured in inches rather than in feet. Reference to Table 1 quite clearly demonstrates the velocity value of even one inch difference of head height. We find the effective result of increasing the head height or velocity head from one inch to two inches results in an increase of the velocity of the liquid volume of 57 *feet per minute.* This very big increase is due to the fact of actually *doubling* the velocity head while operating in the low velocity head range. When we have an initial velocity head of nine inches and raise it to ten inches we have an increase in velocity flow speed equal to 22 feet per minute. The higher the initial velocity head the less the difference of adjustment by one inch, more or less, in the final velocity flow speed. Using the very much higher velocity head height of the faster running fourdrinier machine as a comparison to stress the importance of understanding the relationship of velocity flow speed of liquid volume to formation area in time seconds, the comparison shown in Table 2 is offered for study:

In the higher velocity head range of operation we find that by raising the head *six inches* we increase

TABLE 1

Head (inches)	Head (feet)	2gh	$\sqrt{2gh}$	Velocity (ft. per sec.)	Velocity (ft. per min.)
1	0.0833	5.364	2.314	2.314	139
2	0.1666	10.7	3.27	3.27	196
3	0.25	16.1	4.01	4.01	240
4	0.333	21.44	4.63	4.63	278
5	0.416	26.79	5.177	5.177	310
6	0.5	32.2	5.67	5.67	340
7	0.5831	37.55	6.127	6.127	368
8	0.666	42.89	6.552	6.552	393
9	0.75	48.3	6.95	6.95	417
10	0.833	53.64	7.324	7.324	439
11	0.9163	59.0	7.68	7.68	460
12	1	64.4	8.03	8.03	482
13	1.0833	69.76	8.352	8.352	501
14	1.1666	75.13	8.667	8.667	520
15	1.25	80.5	8.966	8.966	538
16	1.333	85.84	9.265	9.265	556
17	1.416	91.19	9.549	9.549	573
18	1.5	96.6	9.83	9.83	590
19	1.583	101.9	10.09	10.09	605
20	1.666	107.29	10.358	10.358	621

TABLE 2

Head (inches)	Head (feet)	Velocity (ft. per sec.)	Velocity (ft. per min.)	Difference (ft. per min.)
54	4.5	17.02	1021.2	
60	5.0	17.98	1078.8	57.6
1	0.0833	2.314	139.0	
2	0.1666	3.27	196.0	57.0

the velocity speed by 57.6 fpm and in the lower bracket of velocity head operation we find that by raising the head from one to two inches we also increase the velocity speed by 57 fpm.

In the operation of the cylinder mold for the formation of a sheet of paper we are *always* in the *low* bracket of velocity head height. Changes in the stock preparation of freeness or slowness will result in a change of 0.5 to 1.5 inches in an operating total of seven inches of velocity head. This is particularly true of the irregular preparation of filler stock from mixed papers.

This type of change is usually of a gradual nature and, therefore, does not cause breaks by actual rupture of the sheet formation. If the stock is changing to the free side, the formation gradually becomes a little more wild and lumpy. Changing to the slow side, the formation becomes more tightly formed and shows glassy on the mold as formation is complete and the mold emerges from the mixed volume in the circle. As we use from three to five individual molds on filler stock, the cumulative effect on the total sheet of such velocity flow speed change results in:

(1) On the free side, the lumpy formation of the filler sheets shows through the formation of the liner sheet and causes uneven calender finish and caliper. The sheet also loses some rigidity or snap.

(2) On the slow side, the more tightly formed individual sheets comprising the whole offer greater resistance to the passage of heat and the total sheet passing over the drying sections begins to dry harder and requires more steam.

The well experienced machine tender notes the gradual effect of such change as it is taking place on the mold and usually adjusts the overflow dams to the spillway, which alters the SUCTION OR MOLD HEAD INSIDE the mold, or makes adjustment of the amount of water in the mixed volume supplied to the circle on the OUTSIDE of the mold.

Either such adjustment has a DIRECT effect on the head height or velocity head which *governs* the *speed* of the mixed volume in the formation area. The same is true of both such adjustments.

In the operation of the overflow type vat and cylinder mold combination, the position of the slice controlling the amount of mixed volume to overflow back into the circulating system also controls the height of the outside liquid level at the point where formation is *complete* and the revolving cylinder mold EMERGES from the mixed volume. As this point is the MAXIMUM delivery point of the mixed volume by the velocity flow speed created at the INLET to the circle by the initial head height of the mixed volume outside the mold, then RAISING the OUTLET head will *slow down* the velocity in the formation area and LOWERING the OUTLET head will SPEED UP the velocity of the mixed volume *through* the formation area.

Because there is no such mechanical adjustment available on the counter-flow type of vat cylinder mold combination, the opinion is fairly prevalent and it is frequently stated that there is *no* control of velocity flow in the operation of this type of vat. That this is not literally true is evidenced by the thousands of tons of commercially salable boxboard made daily by the counter-flow type cylinder machine. The operating beater engineer can, and in well organized mills does, have very close CONTROL over the water drainage time of the stock he prepares for delivery to the paper machine and thereby can prevent alteration of the initial head height of the liquid volume and insure an EVEN RATE of drainage during formation so that the final head height, this time at the COMMENCEMENT of formation, does not go up or down more than a fraction of one inch. On grades made from solid stock—that is, all the stock of the same grade and prepared and supplied to *all* the molds—machines are run 24 hours a day without a change in *outside* liquid water levels varying more than 0.125 inches.

To quote an opposite extreme, the author is familiar with the operations of a certain folding boxboard mill using counterflow type vats and a considerable proportion of deinked papers in the liner furnish. Most of these deinked papers are of original high grade printing quality and contain quite a high proportion of clays and loading materials.

An occasional bale of this high grade wastepaper would have very little printing matter to *deink*. The operator of the deinking plant would cut down on the WASHING TIME and, consequently, the stock delivered to the beating operations, and subsequently to the machine, would contain considerable clay and loading materials which had not been washed out. As far as the operator was concerned he was saving washing water, power, and time and producing a pulp properly deinked. Such stock, because of the clay loading, operated slow on the machine and RAISED the head height both at the inlet of the circle and the point of formation commencement in the back circle.

Because of the slower rate of drainage the head height of the back circle *remained* relatively high and offered resistance to the initial head height, thereby slowing down the velocity or flow rate of mixed volume speed in the formation area. Conversely, when a lot of printing matter had to be deinked the washing was increased proportionately and *most* of the clay and loading materials were washed out and of course never reached the paper machine. Even though this stock was subjected to the same beating and jordanning in drainage time rate it was much more free than the more heavily loaded sheet. From these causes the author personally observed changes of head height in the back circle of up to two inches in a time period of 65 minutes. Formation quality and drying rate both changed with such variation and the solution of this type of confused operation with the best of motives was simply arrived at by beating the stock to a given freeness value and *then adding*, whenever necessary, clay to bring the freeness to a UNIFORM OPERATING VALUE.

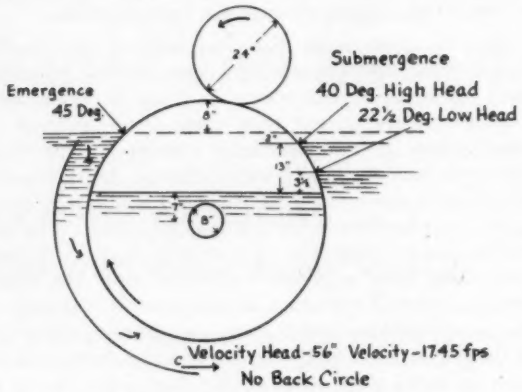


Figure 1—5 ft. diam. counterflow type. Scale 1/20 in.-1 inch

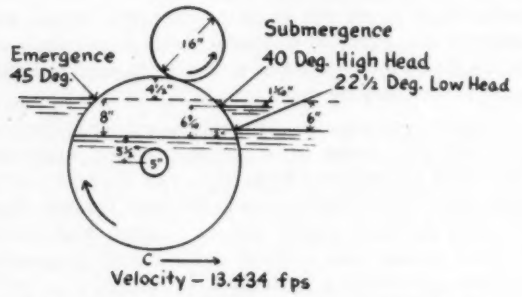


Figure 2—3 ft. diam. counterflow type. Scale 1/20 in.-1 inch

Reference to Figures 1 and 2 show the relationship of the SUCTION or MOLD head INSIDE the mold and the VELOCITY head OUTSIDE the mold in operation with the stock on the *free* side and the stock on the *slow* side. Both figures are of counterflow type vats and are drawn to a scale of 1/20th inch equals one inch so that a direct visual comparison of liquid levels can be made. In both figures a high operating and low operating liquid level *outside* the mold is shown to equate the difference of velocity flow speed of the liquid volume *in* the formation circle. In both figures the *same* liquid level is shown *inside* the mold (mold or suction head, namely three inches over the top of the center shaft of the cylinder mold). This is the average operating inside level for boxboard operation.

As we use many circular units in papermaking, cylinder molds and their couch rolls, press rolls, etc. —all such units regardless of diameter containing 360 deg. comprising the circumference—it is necessary to find the length per degree in order to equate the pressure area of two revolving circles in contact with each other or, as in these two figures, to compute the actual length in feet of formation at different operating liquid levels. Both velocity of liquid flow and the actual formation length per revolution in use *will change* as the *outside* operating liquid level changes.

To find the length per degree of any circle divide the diameter of the circle in inches, feet, or miles according to size by the ratio factor 114.59. For example: Sixty-inch diameter divided by 114.59 equals 0.52361504 inches per degree of circumference. This figure multiplied by the actual number of degrees used for formation purposes will give the actual LENGTH of formation per revolution of mold and the actual DISTANCE the velocity head *must* deliver the mixed volume from which the paper is formed. However, in computing the linear foot speed of the paper machine the total circumference of the cylinder mold is used. As the formation area factor of *length* is *less* than the circumference, then the time in seconds for formation is *less* than the time in seconds to make one revolution. Both figures are drawn to show:

(1) The actual number of degrees and total length of the formation surface in use per revolution at high and low heads.

(2) The proportionate liquid levels inside the mold, SUCTION HEAD, and outside the mold, VELOCITY HEAD, in both the front and back circles.

Figure No. 1

Cylinder mold diameter 60 inches; couch roll set off center 9 inches; counter-flow type operation. High and Low VELOCITY head. Circumference of cylinder mold equals 3.1416 x 5 ft. equals 15.708 feet.

Formation length in use per revolution of cylinder mold:

	High head	Low head
Commencement of formation—SUBMERGENCE...	40.d	22.5d
Completion of formation—EMERGENCE.....	45.d	45.0d
Progressively diminishing formation during total time—SUBMERGED....	180.d	180.d
Total degrees formation.....	265.0	247.5
Total length per revolution.....	11.563 ft.	10.777 ft.
Formation length expressed as per cent circumference	73.612 per cent	68.61 per cent

To facilitate study of the *effect* of velocity head if we assume for the moment that the BACK CIRCLE is entirely eliminated then the actual height of the velocity head in Figure 1 would be from the outside liquid level at point 45 deg. to the point C at the bottom vertical center of the revolving cylinder mold. This is a velocity head of 4 ft. 8 in., or a velocity imparted to the mixed volume at point C equal to 17.45 fps or 1047 fpm.

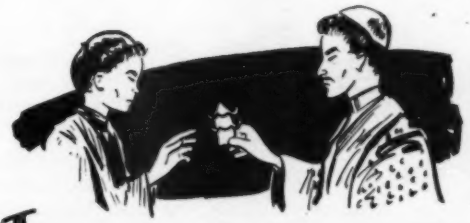
If no obstruction of any kind is offered against this flow speed (such as friction of the revolving mold, suction head pressure forcing the flow of fibers against the surface of the revolving mold and the water through the wire mesh—small, curly arrows—or change of flow direction by building a liquid *resistance* head in the BACK CIRCLE), then this initial flow speed would continue on a horizontal plane at a progressively diminishing speed until the original velocity was balanced by the frictional contact with the stationary body supporting the flow.

All such frictional resistance of any nature, and the building of a column of liquid such as that in the back circle as resistance to the velocity head at the inlet, is defined and equated as HYDRAULIC DROP or SUBTRACTION from the velocity of flow.

(Installment XIII, which will appear in the March issue, continues the author's study of Figure 1 and takes up Figure 2.)

PAPER SKETCHES

A PARACHUTE made of paper saturated with glycerin and commercial alcohol, recently has been patented. This chute, it is claimed, withstands folding and packing for storage without danger of cracking.



Japanese-made paper was used as early as 770 A.D. in the printing of a large quantity of Buddhist "charms" which were placed in small pagodas and distributed to the public.

BRITAIN'S pioneer 16th Century papermaker, John Spelman, was knighted by Queen Elizabeth and was granted the exclusive privilege of gathering rags for papermaking for a period of ten years.

Tokens of cardboard passed as currency among small-town tradesmen in France as late as World War I.

The Paper Industry Names in the News

Geo. M. Gilbert Made Pres. of Gilbert Paper Co.

At the annual stockholders meeting of The Gilbert Paper Co., Menasha, Wis., George M. Gilbert was elected president of the company. He succeeds A. C. Gilbert, now chairman of the board, in the position.

The new president has been associated with the firm since 1913; he has been vice president and treasurer since 1923. A. C. Gilbert had held the company presidency since 1926. T. M. Gilbert remains company vice president and A. C. Haselow secretary and treasurer.

George M. Gilbert

J. C. Koch

John C. Koch Now Conoflow Sales Vice President

Former sales manager of the Philadelphia headquarters of Conoflow Corp., John C. Koch, has been appointed vice president in charge of the company's sales.

Mr. Koch, who joined Conoflow in 1945, was active in sales engineering work for many years before joining the valve and pneumatic control equipment manufacturers.

KVP Makes Southon General Manager of Operations

A recent board meeting of Kalamazoo Vegetable Parchment Co., Parchment, Mich., has resulted in the appointment of Alfred Southon, executive vice president, as general manager in charge of all company operations. Mr. Southon, who will retain his former title, will be assisted by a three man executive committee composed of C. Hubbard Kleinstuck, William J. Lawrence and Charles J. Monroe.

No action was taken by the board to fill the president's seat, vacated with the recent death of Ralph A. Hayward. (Cf. P. I., Jan., 1951) Company directors have not indicated whether or not the new management arrangement would be permanent or temporary. Other action may be taken at the firm's annual meeting later this month.

W. G. Hartford, formerly director of development engineering of Champion-International Co., Lawrence, Mass., has been named assistant production manager for the firm. At the same time the former chief chemist, John Frankevica, was made technical director and *David St. Louis,* formerly tour boss in the paper mill, was chosen as assistant paper mill superintendent. *W. C. Rich III* has joined the firm as an assistant to the technical director.

New Lunkenheimer pres. is Arnall—Rhame to continue as advisor

Upon the resignation of Frank P. Rhame, president of The Lunkenheimer Co., Cincinnati, Paul M. Arnall has been elected to that position.

Mr. Arnall, who assumed his new duties January 2, joined the firm only a year ago, and was serving as first vice president and general manager of the company when elected to the presidency. Mr. Rhame, affiliated with Lunkenheimer for 32 years, will continue as a director, advisor and consultant.

Paul M. Arnall

James L. Knipe

James L. Knipe, associated with Union Bag and Paper Corp., New York, since 1947, has been elected a director and vice president in charge of the firm's corrugated container sales.

Hoberg Executives Serve With Government

Two officials of Hoberg Paper Mills, Inc., Green Bay, Wis., have been appointed to government consultative groups for the paper industry. H. G. Wintgens, Hoberg vice president and assistant general manager, has been named to the pulp, paper, and board industry council; John Maloney, company sales manager, has become a member of the paper and board converted products national advisory committee. Both the industry council and advisory committee act in an advisory capacity to

H. G. Wintgens

John Maloney

several government agencies in connection with the Defense Production Act.

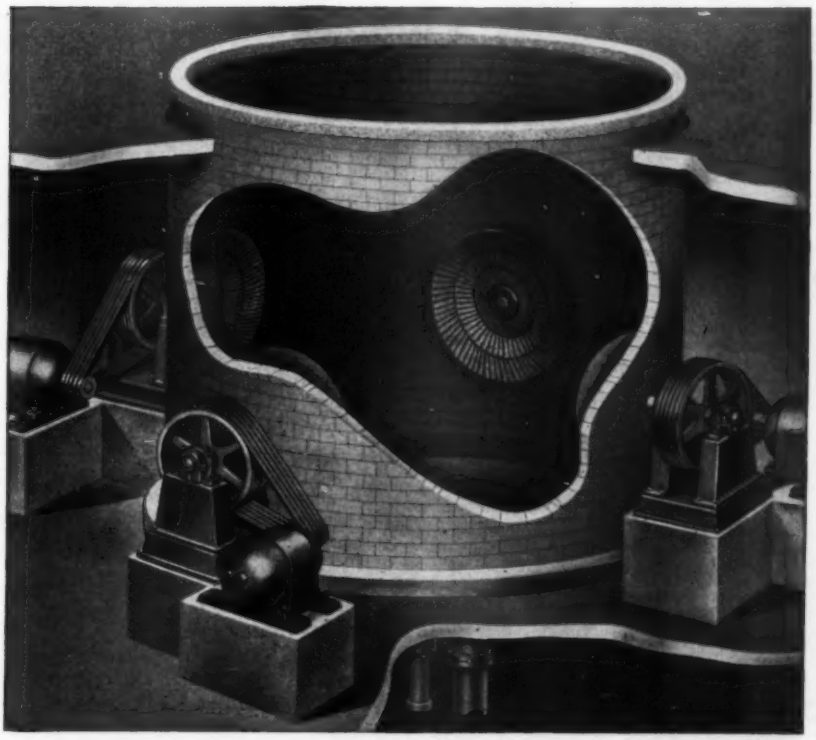
Mr. Maloney spent 37 months in Washington during World War II as an industrial specialist in the tissue paper section of the War Production Board. Mr. Wintgens belonged to both the tissue advisory committee of the WPB and the OPA advisory committee for the paper industry during the same national emergency.

Robert C. Brent, Jr., manager of the Woodlands Division of the St. Joe Paper Co. at Tallahassee, Fla., has been appointed to the State Board of Forestry. Mr. Brent will complete the term of *A. B. Edwards,* which is scheduled for completion September 17, 1951, upon Mr. Edwards' resignation for reasons of health.

Harry Eldridge, grandson of the founder of F. C. Huyck & Sons, Rensselaer, N.Y., was recently elected chairman of the Huyck board upon the resignation of *James L. Braman. Granville Ross Holden* was at the same election chosen presi-

The Rice Barton QuatroPulper

. . . a high production machine . . . ideal for disintegrating pulp, broke or waste paper



Other DynoMachines:

- The **QuatroPulper** is designed for processing stock in large capacities . . . either batch or continuous operation.
- The **DynoChest** is primarily for disintegrating stock in slush form . . . batch operation.
- The **DynoFiner** is for performing the same operation on a continuous basis.

THE stock is charged all at one time into the top of the vat. Four DynoPellers (described below) subject it to the vigorous dynomizing action that completely separates each fibre from its neighbor, maintaining its original length. The simple operating principle and design of the QuatroPulper eliminates the "wracking" and grief of other types of pulpers. Because there are few moving parts there is no loss of production time due to repair or adjustment. The QuatroPulper defibers the stock at low cost and produces a high quality slurry quickly and effectively.

Let us tell you how the QuatroPulper can save YOU *money in processing* YOUR *particular stock. Write today.*

The DynoPeller ·····▸ is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock towards it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles. This effective dynomizing action completely disintegrates the stock . . . separating each fibre from its neighbor while maintaining its original length.

RBR8

RICE BARTON *Research Corporation*
WORCESTER 1, MASS.

dent of the company, succeeding *Francis Huyck Eldridge* who passed away in August. Mr. Braman will continue as a member of the board of directors, and Mr. Holden has become a member of that group.

William E. Biedenbender, ink technician for The Gardner Board and Carton Co., Middletown, Ohio, has been appointed to the newly-created post of foreman of the ink department at the firm's Lockland, Ohio, plant. Mr. Biedenbender, whose promotion comes as a result of Gardner's expanding printing operations, has been associated with the firm since 1940.

Ross Retires From Active Service with Ryerson

After 47 years with Joseph T. Ryerson & Son, Inc., Chicago, Robert C. Ross has retired from active company service.

Vice president in charge of operations for many years, Mr. Ross has served Ryerson in an advisory capacity in connection with the firm's construction program for the past two years. Mr. Ross joined Ryerson as a telegrapher in 1903, later became head of the traffic and service departments, and was made assistant to the company's president in 1929. He became a vice president and director of the company in 1931.

Robert C. Ross

Raymond C. Gaugler

Raymond C. Gaugler Elected President of American Cyanamid Co.

Filling the vacancy left with the recent death of William B. Bell, (Cf. P.I., Jan., 1951) Raymond C. Gaugler has been elected president of the American Cyanamid Co., Bound Brook, N. J.

Mr. Gaugler joined American Cyanamid as an accountant in 1917; steadily progressing through positions of increasing responsibility, he was appointed treasurer in 1929, and vice president in charge of finances in 1939.

The board membership left open by Mr. Bell's passing has been filled with the appointment of Thomas L. Perkins to the position.

Walter L. Rippeteau

A. G. Hendrickson

Rippeteau Given New Post at Wyandotte

Former manager of the market development department of Wyandotte Chemicals Corp., Wyandotte, Mich., Walter L. Rippeteau, has been appointed manager of the organic sales department of the firm's Michigan Alkali Division.

Mr. Rippeteau joined Wyandotte in 1947, after an association with Phillips Petroleum Co. which was broken for five years' service with the U.S. Army Chemical Corps. Going to Wyandotte as a technical field representative, he earned in 1949 the appointment previous to the one being effected now.

Andrew K. Kolar, formerly district manager of the Moline, Ill., office of Link-Belt Co., Chicago, has been appointed assistant sales manager of the company's Pershing Road plant products in Chicago. Mr. Kolar's successor in the Moline managership is *Stuart T. Penick,* former district engineer for the firm at Dallas, Texas.

E. L. Oliver, Jr., Given Vice Presidency

Assuming the duties of P. A. Hoyt, on leave of absence from Oliver United Filters Inc., Oakland, Calif., for health reasons, Edwin L. Oliver, Jr., has been elected a vice president and member of the company's executive committee.

Mr. Oliver, associated with the firm for the past 17 years, has been a company director for nine years, and executive assistant for a shorter time. He will retain his position as director, but company Treasurer and Controller L. R. Boling will assume Mr. Oliver's former duties as secretary.

F. B. Whiting has been elected chairman of the board of Whiting-Plover Paper Co., Stevens Point, Wis., in an election which also made *George A. Whiting* company president, *Thomas Leech* vice president and sales manager, *A. J. Schierl* secretary-treasurer and general manager, and *Thomas A. Moore* assistant secretary and assistant treasurer. These men will also comprise the firm's board of directors.

Hendrickson Leaves Harnischfeger—Now With A. O. Smith Corp.

Former assistant manager of the welder sales division of Harnischfeger Corp., A. G. Hendrickson, has joined A. O. Smith Corp., Milwaukee, as welding equipment sales manager.

Mr. Hendrickson's appointment is the result of A. O. Smith's increased emphasis on marketing of welding equipment for both farm and industrial usage. The new sales manager will work directly under Welding Division Sales Manager L. F. Vonier, who has until now actively managed sales of both welding electrodes and welding machines.

Charles Pennings, Jr., Portland, Me., representative of Williams-Gray Co., Chicago, has been appointed industrial affiliates representative of the Northeastern Division of The American Pulp and Paper Mill Superintendents Association for 1950-1951.

J. A. Extrom, formerly technical consultant for the Mead Sales Co., has become associated with Chas. T. Main, Inc., Boston. Mr. Extrom was technical director of Tomahawk Paper Co., now the National Container Corp., of Tomahawk, Wis., for fifteen years previous to his Mead connection.

E. L. Oliver, Jr.

Mark M. Biddison

Mark M. Biddison Advanced by Gen. Chem. Division

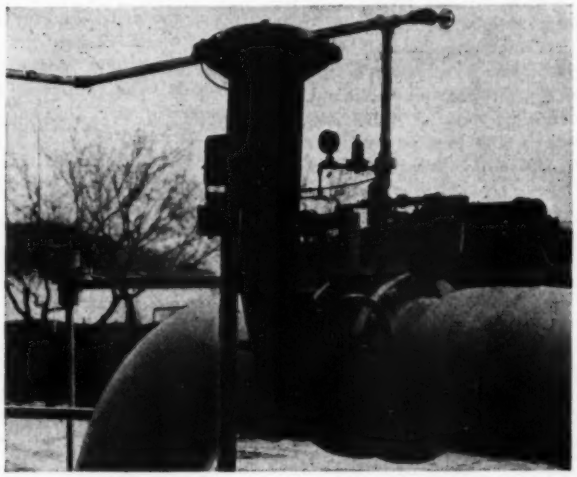
The advancement of Mark M. Biddison to the position of executive vice president has been completed by the General Chemical Division of Allied Chemical & Dye Corp., New York.

A member of the organization for the past 33 years, Mr. Biddison has served as a vice president since 1947, attaining that position after serving as manager of the Cleveland office, manager of sales, assistant general manager and general manager.

Harrison F. Dunning, previously manager of paper mills for Scott Paper Co., Chester, Pa., has been appointed to the newly created position of general operating manager. He will be in charge of all the firm's pulp and paper mills in

R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •



Minimum Pressure Drop
SAVES POWER

The beveled vane of an R-S Valve seats firmly against the valve body to produce commercially tight shut-off with metal-to-metal seat. A rubber seat produces drip-tight closure. In the open position the streamlined vane creates a Venturi action. Pressure drop in R-S Valves is low, and they therefore produce substantial savings in pumping costs.

Illustration shows a heavy duty R-S Valve used in the water system to a compressor house. Valve is equipped with diaphragm motor, handwheel control with self-locking worm and gear and declutching mechanism together with outboard bearing for operating shaft with goose neck support.

Every R-S Valve is engineered and constructed for rugged service and provided with such safety factors that it will give complete satisfaction in the service for which it is designed. Consult with your local R-S Valve Engineers or write direct.

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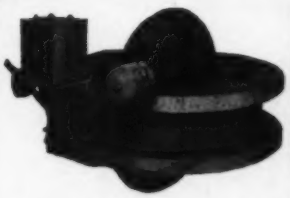
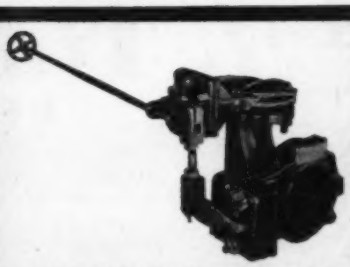
No. 579—6-inch 15-pound Direct Action Float Valve with counter-weight assembly.



No. 628—Solenoid Trip Valve is used for emergency service. The solenoid can be arranged with the counter-weight mechanism to open or close the valve and hold it there in one position or the other. If for any reason the solenoid functions, the latch is tripped, which permits the counter-weight to open or close the valve by gravity. The assembly is suited to shut off the flow or to open a vent and requires manual reset. Can be constructed of any metal or alloy and in various sizes for air, gases, steam, oil, hydraulic and other services.

No. 677—1500-pound Welding End Steel Valve for superheated steam service. A.S.M.E. standards with heavy duty handwheel control.



No. 795—Three-inch 3-way Valve Type No. 733 utilizing standard tee and two wafer valves with extended handwheel control.

eight states. Directly assisting Mr. Dunning will be *Paul C. Baldwin,* formerly Chester, Pa., plant manager, and *Forrest Brainerd,* formerly manager of company pulp mills.

William H. Smith, a director and vice president of Abitibi Power and Paper Co., Ltd., New York, has been named executive vice president of the firm. Concurrently, *Clark B. Davis,* formerly manager of the woodlands department, was named woodlands vice president, and *Robert J. Askin,* formerly manager of mills, was named vice president of manufacturing.

Emmett Below, former credit manager of Marathon Corp., Menasha, Wis., has been appointed controller of the firm. *Melvin Nield,* assistant credit manager for the past four years, has assumed Mr. Below's former position.

Edwin R. Bartlett has been elected chairman of the board of Hooker Electrochemical Co., Niagara Falls, N.Y., in an election which also made *R. Lindley Murray* president of the company.

Elmer F. Twyman, vice president in charge of the Philadelphia Division of Yale & Towne Manufacturing Co., New York, has been elected vice president of The Electric Industrial Truck Association for the 1951 term. Mr. Twyman succeeds M. W. Meddick, vice president and sales manager of Elwell-Parker Electric Co., in the post.

D. A. Moran, resident manager of the Deferiet mill of the Printing, Publication & Converting Paper Division of St. Regis Paper Co., New York, will henceforth be responsible for that Division's Harrisville mill as well. *Sherman F. Valentine* continues as resident manager at Harrisville, where *William A. Argy* remains as mill manager.

W. A. Finn has been named general European manager of Worthington Pump and Machinery Corp., Harrison, N.J. He replaces A. W. Fraser, who is assuming an executive sales position with Worthington, and will shortly make Chicago his headquarters.

L. W. Jander has been named sales manager of the Industrial Division of Henry Disston & Sons, Inc., Philadelphia. Mr. Jander, who has been associated with the firm for the past 16 years, fills the vacancy left with the recent resignation of *J. F. Wilkinson.*

Scott Paper Co. Chooses Three New Mill Managers

Three new plant managers have been appointed for the Chester, Pa., and Sandusky, Ohio, plants of Scott Paper Co., New York, and the Empire, Ore., plant of a Scott subsidiary, Coos Bay Pulp Corp. John W. McNichol will take over the activities of Paul Baldwin as head of the Chester plant; Mr. Baldwin will henceforth devote his entire attention to his duties as assistant to the general manager in charge of operations at all mills.

At Sandusky, Richard Coffman will serve as plant manager; the corresponding position at the Empire mill has been assumed by Henry S. Godshall, Jr., upon the resignation of C. Wylie Smith.

Hereafter, Scott will operate the Empire plant and Coos Bay Pulp's other mill at Anacortes, Wash., as separate units rather than jointly as has been done in the past. Distance between the two plants is too great for efficient management as one operation.

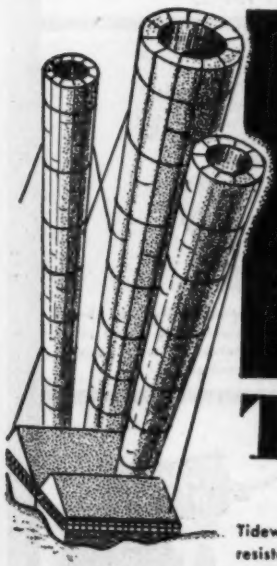
Roland A. Packard has resigned as executive vice president and general manager of Holyoke Machine Co., Holyoke, Mass., and has joined the Lowe Paper Machine Corp., also of Holyoke, as assistant to the president and consulting engineer. Before joining Holyoke Machine Mr. Packard was assistant to the president of Bagley & Sewall Co., Watertown, N. Y.

Frank J. Lang, general manager of Dexter Sulphite Pulp and Paper Co., Dexter, New York, for the past some years, has relinquished that position to become consulting engineer to the K. S. Irving pulp and paper enterprises. The Dexter mill has been owned by Mr. Irving for some time.

Donald D. Pascal has been named vice president in charge of sales for National Starch Products Inc., New York. Mr. Pascal was formerly vice president in charge of Eastern and Pacific Coast sales divisions.

S. T. Mackenzie, head of the Philadelphia office of Babcock & Wilcox Co., New York, has been appointed to the newly created post of sales manager. *R. W. Buntin* will replace Mr. Mackenzie in the Philadelphia office.

William L. Hunter, formerly general manager of the Northern Equipment Division of Continental Foundry & Machine Co., Erie, Pa., has been named vice president and general manager of the Division.



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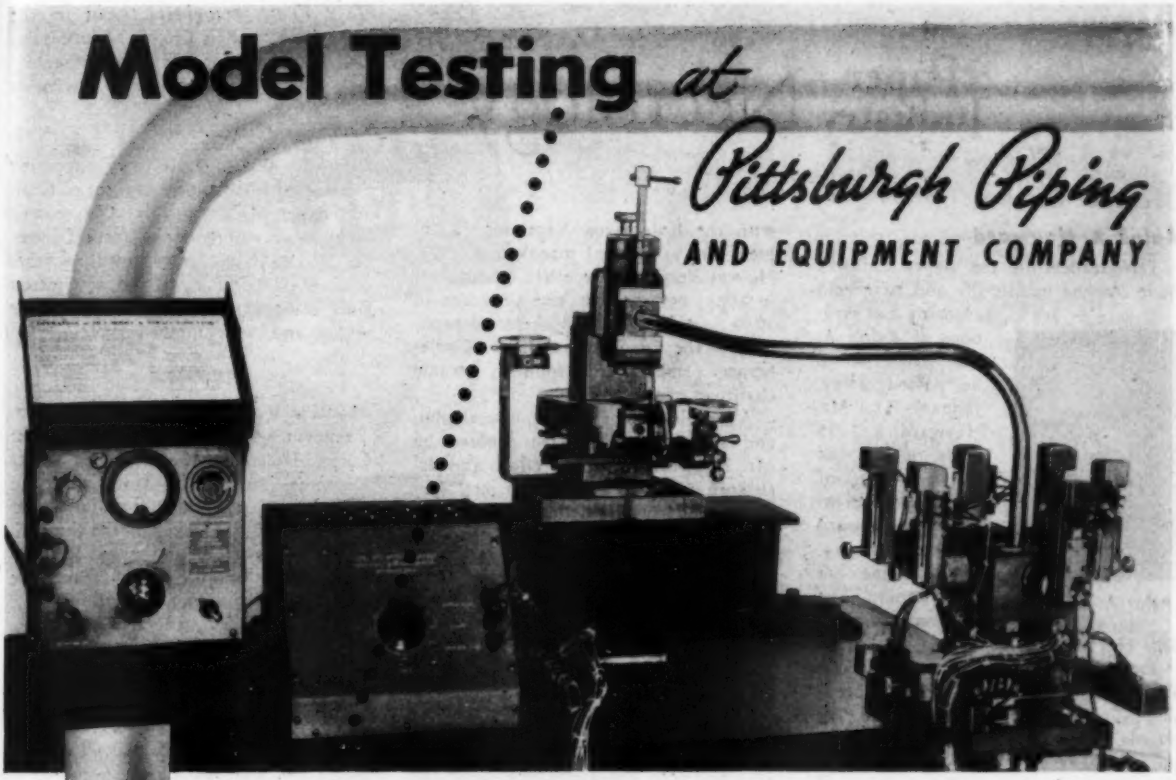
Model Testing at Pittsburgh Piping AND EQUIPMENT COMPANY



The Modern Method for Complete, Practical Pre-determination of Piping Flexibility

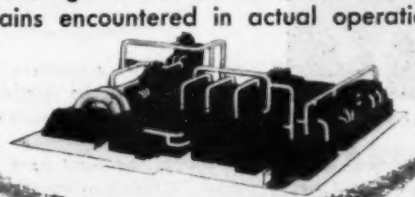
Model testing is one of the many technological advancements thoroughly investigated and proved by Pittsburgh Piping and Equipment Company before being made generally available. It provides complete advance knowledge of the reactions of any type, size, and system of power piping.

The testing apparatus shown above accurately measures and directly indicates the physical reactions of a section of pipe which exactly duplicates, in miniature, the planned layout. These measurements are projected to give precise information on the full size system as a check against theoretical calculations.

On complex piping layouts, model testing provides a complete analysis instead of theoretical approximation; it is a time and labor saver; and the possibility of mathematical error is minimized. Its use helps to avoid excessive stresses, reactions, and movements in the final system which could affect joints and thus cause leakage, or damage anchors and equipment connected to the pipe line.

Look to Pittsburgh Piping and Equipment Company for leadership in methods that assure greatest safety, highest efficiency, and longest service from high temperature, high pressure piping.

Model Testing makes possible the planning of high-pressure, high temperature piping systems with accurate advance knowledge of end reactions, stresses, and strains encountered in actual operation.



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The Paper Industry Necrology

Ralph A. Hayward

Few leaders in the paper industry have reached middle life and have held as many top positions as Ralph A. Hayward. When he passed away, January 11, Mr. Hayward was 55 years of age; he was president of three paper mill organizations; board chairman of two, and board member of another. The positions held by Mr. Hayward were:

Ralph A. Hayward

President of the Kalamazoo Vegetable Parchment Co., Parchment, Mich.; president, The KVP Company Limited, Espanola, Ontario; president, KVP Company of Texas, Houston; chairman of the board, Appleford Paper Products Ltd., Hamilton, Ontario; and Harvey Paper Products Co., Sturgis, Mich. He also was a board member of Sutherland Paper Co., Kalamazoo.

Mr. Hayward was a past president of the Technical Association of the Pulp and Paper Industry. He was a member of the board of regents of the University of Michigan, of which he was an alumnus. He also was a trustee of Kalamazoo College.

A native of the State of Michigan, Mr. Hayward spent his early life working along the Great Lakes. He saved his earnings and put himself through the University. Prior to World War I, he was associated with the Spanish River Pulp and Paper Co., Espanola, Ontario, as resident engineer under R. B. Wolf, manager of the company. With the outbreak of the war, he joined the ordnance department of the Army and served as district metallurgist in the Rochester district. Following the war, he returned to the paper field, joining the consulting engineering firm of R. B. Wolf Co. While with that concern, he was resident manager and plant engineer of the Fraser Co., Ltd., New Brunswick; consulting and designing engineer for the Miami Paper Co., Dayton, Ohio, and then in charge of engineering and construction in rebuilding the plant of the Newton Falls Pulp and Paper Co., Newton Falls, N.Y.; later he was in charge of the operating and engineering departments.

Mr. Hayward first became associated with the Kalamazoo Vegetable Parchment Co. as general manager in 1924. He was elected to the board of directors in 1928; became first vice president in 1930, and in 1936 he was elected president at the time the late Jacob Kindleberger, president and founder, became chairman of the board.

A long list of local, state, educational, and national bodies have profited by Mr. Hayward's untiring effort and assistance. He was particularly interested in many forms of better youth movement.

Surviving are the widow, and a son, John, of Kalamazoo.

Carl E. Apelgren, chief chemist of the Oswego and Northern New York plants of St. Regis Paper Co., New York, passed away December 27 at the age of 55. A member of the American Chemical Society and TAPPI, Mr. Apelgren had been associated with American Writing Paper Co. before he joined St. Regis.

Boyd "Pat" Daugherty, head of the Bemis Bro. Bag Co., St. Louis, sales office in New York until his retirement five years ago, passed away December 30.

John W. Gulledge, recently appointed assistant plant superintendent of Crossett Paper Mills, Crossett, Ark., passed away in an automobile accident December 21. Mr. Gulledge, who was 38 years of age, had been employed at Crossett since it began operations in 1937. The widow and two children survive.

Matthew V. Horgan, a retired superintendent of American Writing Paper Corp., Holyoke, Mass., passed away December 30. Mr. Horgan, who had retired from AWP service about a year ago, was a life member of the Superintendents Association and served as chairman of that group for many years. The widow and two daughters survive.

John Avery, president of Roots-Connersville Blower Corp., Connersville, Ind., since 1946, passed away January 13. Before joining Roots-Connersville, Mr. Avery was associated with General Electric Co. and Allis-Chalmers Manufacturing Co.

The Paper Industry Safety News

Chas. Alexander Heads Industrial Dept. of National Safety Council

An important appointment by the National Safety Council, Chicago, is that of Charles F. Alexander, who has been named manager of the Industrial Department, according to a recent announcement by Ned H. Dearborn, Council president.

Chas. F. Alexander

Mr. Alexander, who has had extensive industrial experience in the fields of production, engineering, foreman training and sales, joined the Council after five years with the Cherry-Burrell Corp., Chicago. His most recent position there was as assistant general manager of manufacturing with duties including the co-ordination of production methods and defense contracts.

For two years he was senior staff engineer with the Buick Motor Division of General Motors Corp.

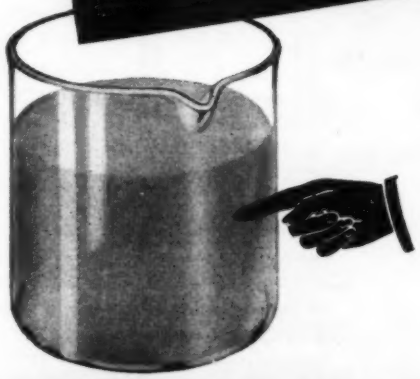
The appointment of Mr. Alexander was effective February 1.

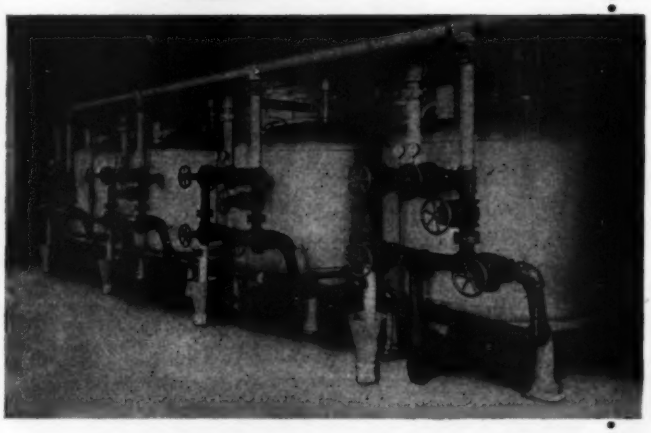
A. M. Baltzer, assistant manager of the Industrial Department since 1946, continues in that capacity.

NO LOST TIME ACCIDENTS have been experienced at the Wellsburg, W.Va., paper mill and bag factory of Pillsbury Mills, Inc., Minneapolis. The 115 employees at the plant have worked more than 650,000 man hours since the mill's last lost-time accident occured on October 31, 1947.

A GRAVER FILTER

makes the difference





Does your water supply contain sediment . . . silt . . . organic matter or other suspended solids, fine or coarse? Is it ever cloudy or colored?

If so, Graver has the remedy . . . not just a single design of filter offered for any and every clarifying need, but a complete range of filters to include exactly the right unit for each kind and amount of suspended matter.

Graver Filters include pressure and gravity types; sand and gravel, Anthrafilt, and diatomite filtering media; and special designs for removal of iron, oil, taste and odor. Moreover, Graver Filters can be arranged to correct certain other water conditions, such as low pH; and can be combined with other Graver apparatus for additional water conditioning, such as removal of hardness.

Many thousands of Graver Filters are installed all over the country, in plants of every industry, and serving every filtering need.

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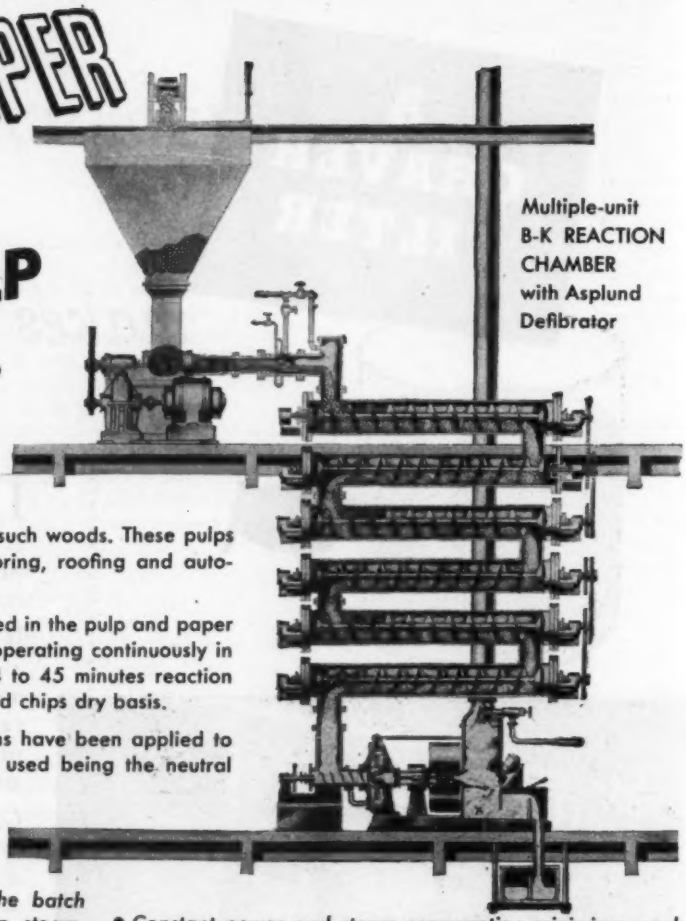


Multiple-unit B-K REACTION CHAMBER with Asplund Defibrator

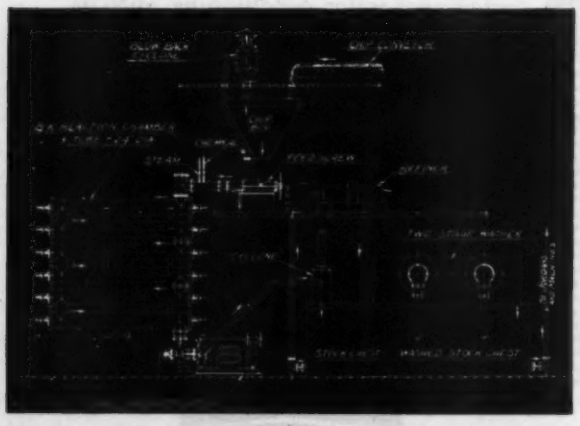
The Chemipulper produces, continuously, grades of pulp to meet specific requirements, using either hard or soft woods, or mixtures of such woods. These pulps are used for making .009 for corrugating; flooring, roofing and automotive felts, and insulating board.

More than fifty operating units have been installed in the pulp and paper industry . . . units built with from 2 to 8 tubes, operating continuously in 150 to 175 p.s.i. steam pressure range; from 4 to 45 minutes reaction time, and handling up to 100 tons a day of wood chips dry basis.

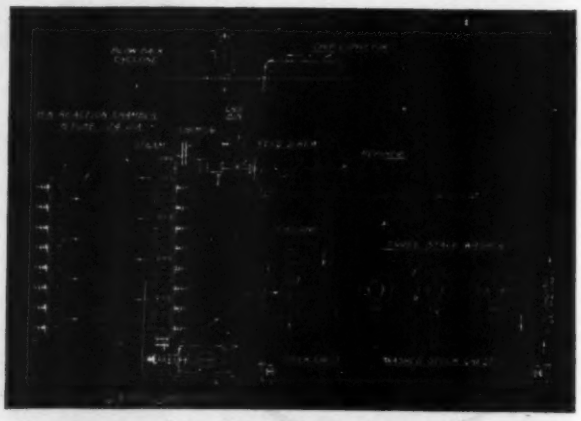
Several chemical agents of varied concentrations have been applied to the Chemipulper operation, the most generally used being the neutral sulphite and kraft cooking liquors.

Write for new Bulletin C2

- *The Chemipulper operation as compared to the batch digester usually shows a substantial saving in steam, power and labor costs.*
- *Continuous operation of Chemipulper means less chip storage and conveying equipment . . . and less pulp storage capacity.*
- *Constant power and steam consumption minimizes peak loads.*
- *Chemipulper space requirements are less than the batch digester for equivalent production capacity, thereby reducing building costs.*



Flow drawing of the CHEMIPULPER with auxiliary equipment for producing semi-chemical pulps for Corrugating Board.



Flow drawing of the CHEMIPULPER with auxiliary equipment for producing semi-chemical Neutral Sulphite and Kraft Pulps.

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The Paper Industry Association News

D. C. Everest Becomes 21st President of the American Forestry Ass'n

The American Forestry Association, now in its 75th year of educational service and conservation promotion, has elected its 21st president.

The new Association president, D. C. Everest, is chairman of the board of Marathon Corp., Rothschild, Wis. He succeeds A. C. Spurr of Monongahela Power Co., Fairmont, W. Va., who served during 1949 and 1950.

Recipient of an American Forestry Association conservation award in 1949, Mr. Everest has long been a leading forestry conservationist in the mid-west. He helped influence establishment of the U.S. Forest Products Laboratory at Madison, Wis., has been instrumental in promoting its growth.

At the same meeting, Association members chose George W. Dean, state forester of Virginia, and Edward P. Stamm, logging manager for Crown Zellerbach Corp. in Oregon, as directors. Samuel T. Dana, dean of the School of Natural Resources of the University of Michigan, and George W. Merck, president of Vermont Forest and Farmland Foundation, were reelected as directors.

Three Distinguished Speakers at Chicago TAPPI—Nadelman, Lewis, and Libby

The January meeting of the Chicago Section of TAPPI, held on the evening of the 15th, was a most unusual one. It was particularly outstanding since program featured three headline speakers, each representing a well-known education institution that offers training for pulp and paper technical people.

The three guest speakers were:

Dr. Alfred H. Nadelman, professor of pulp and paper technology, Western Michigan College, Kalamazoo, Mich.

Dr. Harry F. Lewis, dean, institute of Paper Chemistry, Appleton, Wis.

Prof. Clarence E. Libby, head, department of pulp and paper manufacturing, New York State College of Forestry, Syracuse, N.Y.

The speakers discussed the growing shortage of trained technical personnel. As an example of what the future may bring, Dr. Nadelman reported that of nine senior students in his department, only three are sure of graduation and working in industry. He painted a still darker picture by stating that a large number of sophomores are enlisting to get a choice of service and thus the supply of students is being cut off at the roots. Dr. Libby corroborated the view that a mere trickle of men will graduate when he informed the audience that of twenty-five seniors in the Pulp & Paper Department, only five to eight will be available to industry.

New York State College of Forestry doesn't normally take girls—two were enrolled during World War II—while Western Michigan College is considering the recruitment of girls.

In the research field, Dr. Lewis described the experimental testing program being carried on to develop methods of determining if a man has the required talents for work in pulp and paper. Dr. Libby described their work on making hardwoods into top grade pulps.

A question and answer session followed the formal talks.

Set-up Box Competition Will Be Part of National Paper Box Assn. Meeting

The National Paper Box Manufacturers Association is sponsoring a Set-Up Paper Box Competition in conjunction with its 33rd annual convention, to be held in Atlantic City June 3-6. All entries will be exhibited at the convention, prize winners having previously been chosen by a panel of judges. Purpose of the competition is "to improve the quality and sales appeal of set-up paper boxes by members of NPBMA by offering suitable recognition to outstanding boxes."

Winners will be announced June 4 at the first business session of the meeting; prizes will be awarded the next morning. Scrolls and plaques will be awarded to the winning box manufacturer of each prize entry, and to his customer as well.

IN A SPECIAL MEETING held at the Union Club in New York, the Manufacturing Chemists Association, Inc., elected Dr. D. S. Frederick, vice president of Rohm & Haas Co., Philadelphia, to a newly created directorship.

Coming Events

Feb. 16—Lake Erie Papermakers and Converters will meet at the Hickory Grill, Cleveland, Ohio.

Feb. 19-23—Paper Week, annual meeting of the American Paper and Pulp Association and paper groups, at the Waldorf-Astoria Hotel, New York City.

Mar. 6—Meeting of Metropolitan Section of TAPPI at Fraunces Tavern, New York: subject will be "Use of paper by business."

Mar. 8—Ohio TAPPI will meet at the Manchester Hotel, Middletown, Ohio.

Mar. 13—Lake States Section of TAPPI will meet at Stevens Point, Wis.

Mar. 22—Delaware Section of TAPPI will meet at the Engineers Club, Philadelphia.

April 3—Meeting of Metropolitan Section of TAPPI; subject will be "Machinery innovations in the industry."

April 13—Annual meeting of Pacific Coast Section of TAPPI; featuring annual Shibley Award contest.

April 17-20—20th National Packaging Exposition of the American Management Association, in Atlantic City, N.J.

April 30-May 4—Materials Handling Conference, sponsored by American Material Handling Society, will be held in Chicago in conjunction with the Society's Materials Handling Exposition.

May 1—Metropolitan Section of TAPPI will meet; subject will be announced at a later date.

May 4-5—Spring meeting of the Northwestern Division of the Superintendents Association, to be held at the Radisson Hotel, Minneapolis, Minn.

May 7-11—Greater New York Industrial Show, sponsored by New York Technical Societies Council, at the Armory, New York.

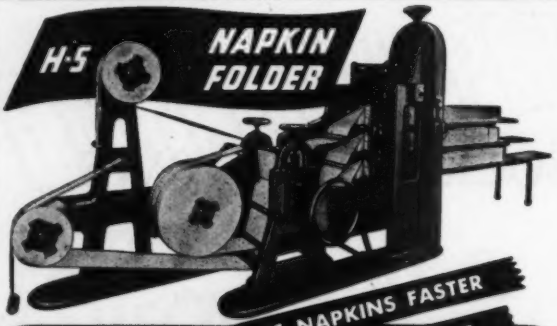
May 11-12—Spring Meeting of the Pennsylvania-New Jersey-Delaware Division of the Superintendents Association, to be held at the Hotel Easton, Easton, Pa.

June 3-6—Set-Up Paper Box Competition will be a feature of the 33rd annual meeting of the National Paper Box Manufacturers Association, to be held in Atlantic City.

June 7-9—Summer meeting of the Technical Section of CPPA, to be held at Bigwin Inn, Lake of Bays, Ont., Canada.

June 24-29—Annual meeting of the Superintendents Association to be held at Multnomah Hotel, Portland, Ore.

Sept. 14-15—Fall meeting of the Northwestern Division of the Superintendents Association to be held at the Northern Holiday Resort, Marenisco, Mich.



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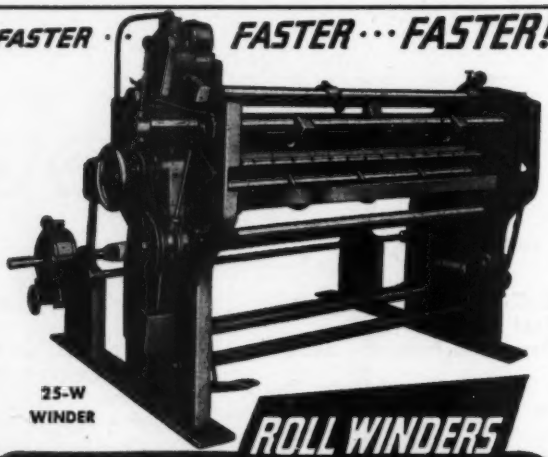

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A new, high speed slitter and rewinder for converters of locker paper, shelving paper, household wax rolls, and paper and cellophane gift wraps. Produces perfect rolls with increased production and lower maintenance costs. Write for complete information.

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. . . are built in single, double and triple reduction types. Symmetrical gear arrangement provides balanced loads on liberally proportioned bearings. Housings are substantially constructed, well ribbed and have generous pads for foot bolts.

The method of selecting these reducers with complete horsepower and dimension tables is shown in Catalog 70.

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The Paper Industry International Review

New plant discovered—if grown in South Africa may yield new fiber

An AP release from Johannesburg (So. Africa) states that South Africa will be able to produce all the bags and twine, as well as a high percentage of the paper it needs, when cotine, a plant which yields fibers suitable for papermaking and other uses, can be grown there.

Tests by the Shirley Institute, Lancashire, England, have proven cotine reliable; it will be grown in South Africa as soon as government permission is obtained for the import of seed.

Samples of twine, paper, knitted and woven fabrics produced from cotine were recently displayed by H. Fraser Johnson, who has the backing of one of the Union's largest seed firms. Every part of the plant is useful; even the seed's oil is edible.

Cotine can be grown at any altitude to 2000 feet above sea level, needs no watering, and fertilizes itself with its own leaves. An estimated 174,000 plants can be grown to an acre of land; one acre produces 800 pounds of cotine, while only 150 pounds of cotton can be grown on the same space.

A cotine plant matures in four months, and lives for about 10 years. By the fourth year the plant quadruples its size, and retains that size indefinitely. Production of cotine in South Africa will cost about three cents a pound.

Two Austrian plants get modernization fund from ECA

Modernization of two Austrian plants, Nettingsdorfer Papierfabrik Aktiengesellschaft, Nettingsdorf, Upper Austria, and Leykam-Josefsthal, A. G., Wien 1, Parkring 2, will be accomplished with a $3,381,000 grant from the Economic Co-operation Administration.

The Nettingsdorfer project provides for construction of a new and completely integrated kraft pulp and paper mill to be operated by Nettingsdorfer Papierfabrik A.G., in conjunction with facilities of an existing mill. Presently, the mill makes 11,000 metric tons of sulphite and groundwood pulp each year; production of sulphite wrapping paper and sulphite ground wood paper—including newsprint—totals about 18,000 metric tons a year. After the new mill is installed, about 30,000 metric tons of unbleached kraft pulp will be produced annually; about 24,000 metric tons will be converted into basic grades of kraft paper, and the remainder will be processed on older existing machines.

About one third of the cost of this project, or $2,280,000, will be financed by ECA dollars. Improvements made possible by ECA will include equipment purchased in the United States; a large, modern high-speed fourdrinier will be contracted for here.

The Leykam-Josefsthal project, which will receive about a quarter of necessary funds—or $1,101,000—from ECA, will encompass installation of a 145 inch trim paper machine which will be purchased in the United States. Production of bleached sulphite pulp should increase from 25,200 metric tons per year to 31,680; paper output should rise from 12,000 to 20,000 metric tons a year. The mill now makes such fine quality paper as is needed for writing paper, drawing paper, school copy books, blotting paper, and paper cut material.

These two modernizations should increase Austria's world paper exports by about $3,500,000.

Fourth Meeting of Technical Committee on Wood Chemistry at Brussels (August 25-27th)

In late summer of 1949, this committee of the Food and Agriculture Organization of the United Nations, met at Brussels. The following agenda was adopted:—(1) Integrated wood utilization, (2) pulping of tropical wood species (and other materials) (3) progress in cellulose chemistry, and (4) progress in lignin chemistry.

In these various fields, twenty-two papers were presented (or discussed) by representatives from France, Australia, U.S.A., Finland, Paraguay, Brazil, Austria, Italy, England, Belgium, Argentina, Norway, Switzerland and Holland. (From the Minutes of the 4th Meeting of the Technical Committee on Wood Chemistry (F.A.O. of the U.N.).

DRUPA Düsseldorf 1951

The first information about the International Exposition of Printing and Paper—called DRUPA—has met with considerable interest. The desire of experts for a comprehensive show demonstrating the capacity of the graphic trade, the paper and pulp working industries, and all kindred trades is a very strong one in all economic branches which are concerned. All competent associations in the Federal Republic have already confirmed their readiness for co-operation and assistance.

This special show, under the managership of Federal Minister of Economics Dr. Edhard, will be held at Düsseldorf. Exhibits will be classified as: (1) machinery and accessories, (2) raw materials and auxiliary means, (3) graphic products, (4) paper and pulp working, (5) advertising art, and (6) associations.

Plans for the DRUPA exhibition have found a great number of interested people abroad. This proves that there is also a strong desire for resumption of economic relations and exchange of experiences felt during the past decade. Thus, Dr. Freiherr von Maltzen, permanent secretary of the Federal Ministry, was able to cable while traveling in Brazil that many people there are already looking forward to the exhibition with high expectations.

The Exhibition, which will open on Saturday, May 26, will close on Sunday, June 10.

Paraguayan Cane, a Raw Material for Paper Pulp

Laboratory studies were made on the kraft pulping and bleaching of *Cana picanilla* (*Guada Paraguayana* [Doell]). The authors have covered a wide range of temperatures, alkali concentrations, and time schedules, and optimum conditions for pulps with varying bleachabilities were determined. This fibrous raw material, which is abundant in Paraguay, lends itself readily to pulping, the pulp qualities are satisfactory and the yields are good.

The authors give five table. J. J. Patettor, A. Kumayay, F. Vay, J. Rubi and A. Capo F.A.O. of the United Nations. Fourth Meeting of the Technical Committee on Wood Chemistry 91-105 (Brussels 1949). (In English)

A NEW PAPER MACHINE which is part of a £3,500,000 developmental plan under way at Boyer Newsprint Mill, Tasmania, had a satisfactory trial run in December. Under construction for the past two and a half years, the machine is 300 feet long and 20 feet wide. When it goes into full production, it will make a paper sheet 230 inches wide at a rate of about 1200 fpm. Ultimately expected to produce about 1000 tons of newsprint a day, the machine will increase production at the Boyer mill by some 70,000 to 80,000 tons a year.

EXHIBITION SPACE is now being allocated for the 25th Brussels International Fair, to be held April 21 to May 6. Thus far, 13 countries will be officially represented at the Fair; all but nine of the 32 industrial sections included in the exhibition have already accepted as many exhibitors as available space permits.

PAPER PULP IS BEING MADE FROM sugar waste in a Hungarian sugar refinery in an attempt to provide steady work for employees during the sugar industry's off seasons.

Foreign Abstracts . . . . . .

Argentina's subtropical trees in the pulp and paper industry

In the extreme northeast of this country there is a forest area, known as the Misionera Forest, with an enormous number of species (sometimes 90 different kinds of timber per hectare). Some of the more valuable deciduous trees are described, but one of the most important coniferous woods is "Parana pine" (*Araucaria angustifolia*).

Controlled experiments were carried out in a part of this forest, in afforestation. The system used involved (a) removal of useful trees from virgin forests, (b) controlled burning of the rest, (c) direct sowing of araucaria seed. In some instances "polyculture" was used; i.e. maize, cassava (*et al*) were sown between lines of araucarias during the first year, both because of profit from these agricultural crops, and to shade the seedlings slightly during early stages of growth. This growth was very rapid (during November-March as great as 20 cm. per month). The economic importance of these experiments is stressed.

The author also outlined the great potentialities in the so-called Rio Parana Delta (between Buenos Aires and Rosario). Here poplar and willow grow rapidly yielding 250 cubic meters per hectare, every seven years (i.e. 100 and 140 tons respectively per hectare). The work of a demonstration station in this area, consisted in biological replacement of valueless herbaceous species by important timber (or pulpwood) trees. In this region, various species of eucalyps offer marked possibilities. L. A. Tortorelli (Director General of State Forests, Buenos Aires, Argentine). Fourth Meeting of the Technical Committee on Wood Chemistry (1949). 111-114 (In English).

Simple test for detecting porosity in films

Hydrogen peroxide (35-40%) is placed in a small flask with a wide mouth, which is then closed with a clean cork stopper with a central hole, of specific diameter. A strip of the film to be tested is placed over the opening, and over this is placed a (brown) lead sulphide reagent paper of proper size and shape. These layers are held in place by a clean, clear glass plate. Depending on the thickness and porosity of the foil, the hydrogen peroxide, penetrating the film causes a brightening of the dark brown color of the reagent paper due to oxidation of lead sulphite to sulphate. This degree of brightening under identical conditions of temperature, diameter of cork boring, and time period, serves as a means of evaluating and comparing the porosities of different films or foils.

In the case of very thin (and very porous films) the method may be modified as follows. The surface of a filter paper is charged with hydrogen peroxide and the foil pressed against this paper and overlaid by the lead sulphide reagent paper. The three layers are sandwiched together between two clean glass plates, and again, the changes are noted (brightening of lead sulphide). Results are comparable only when the plate pressures are identical. Hans Freytag *Chem-Ztg.* 74, No. 37, 551 (Original in German).

Initial tear of paper, board, etc.

The author has established a series of ratios involving tensile strength, internal tear and initial tear for newsprint, wrapping papers, bleached and unbleached sulphite sheets, writing papers and of vegetable parchments, greaseproof papers, glassines and cellophanes of various basis weights. The samples were tested both in the machine and cross-machine directions, and the stronger sample labeled I and the weaker one II. Thus the ratios of tensile I:II, of internal tear I:II and initial tear I:II were established. Similarly the ratio of the initial tear of I to tensile of I (and an entire series of such ratios) were determined.

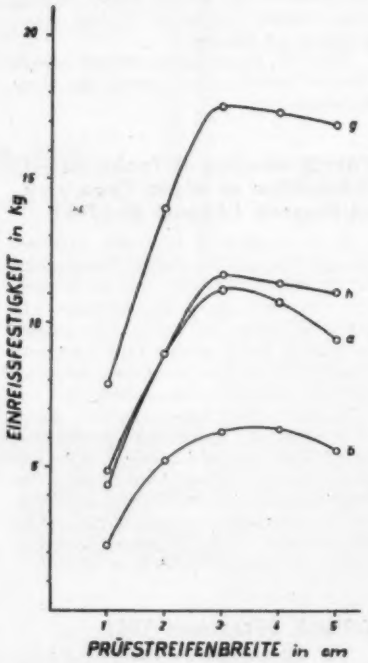

Figure 1

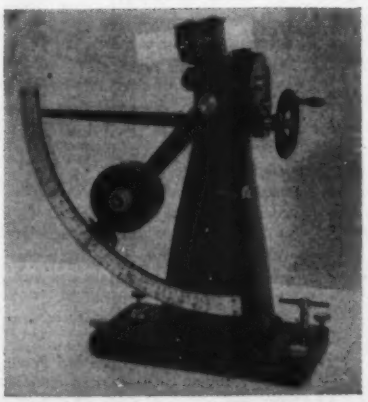

Figure 2

It was found that for initial tear, the width of a test strip was of marked importance. For example, a strip, 1 cm. in width showed a very low initial tear, whereas one about 3 cm. in width showed in most cases the optimum initial tear. This property decreased when a strip, 5 cm. wide was used. This is shown graphically in Figure 1 (where initial tear in kilograms is plotted against strip width (Prüfstreifen breite) in cm. In this figure, *a* and *b* are strips of kraft paper taken respectively in the machine and cross machine directions. Similarly *g* and *h* are strips taken from a board sample in the machine and cross directions.

Figure 2 shows the apparatus used in making initial tear determinations. The equipment is made by A. van der Korput, Baarn, The Netherlands. Julius Bekk (Amsterdam). *Wochenblatt Papierfabr.* 78, No. 17, 512-15 (1950). (In German.)

Determining the Suitability of Dissolving Pulps for Viscose Manufacture

The usual analytical data (*i.e.* degree of polymerization, alpha-cellulose, *et al*) furnish no adequate means of determining whether or not a dissolving pulp forms readily filterable viscose solutions. The so-called "filtration constant" furnishes such a method, but cannot serve as a control, because of the time required. The author has used in principle a totally different method devised by Klemm, (*Papierkunde* 257 [1910]) which can be adequately correlated with the filtration value of a pulp and which is extremely rapid.

Two grams of wet pulp (containing about 65% water) or one gram of air dried pulp is beaten 15 minutes in a Schopper disintegrator, with one liter of water to which 1 cc. of a standard malachite green (*A*) solution has been added. (This dye solution contains 50 grams *A* and 20 cc. glacial acetic acid per liter of water.) Pulp sheets are then formed from pulp suspension, under conditions illustrated by the author, and are washed and dried at 105 degrees. These are then compared with pulp sheets whose viscose solutions have known filtering properties.

They can be divided roughly into five groups. (1) Those which are stained green with dark green individual fibers present, (2) those which are pale green with green individual fibers (3) those which are sky blue, but contain green fibers (4) those which are evenly stained sky blue and (5) those stained uniformly light blue. It was shown that group (1) gave non-filterable sols, (2) filtered very poorly, (3) were difficultly filterable (4) could be filtered, whereas (5) were readily filterable. The author compares these color tests with actual filtration values (i.e. "filtering constants") of commercial pulps,

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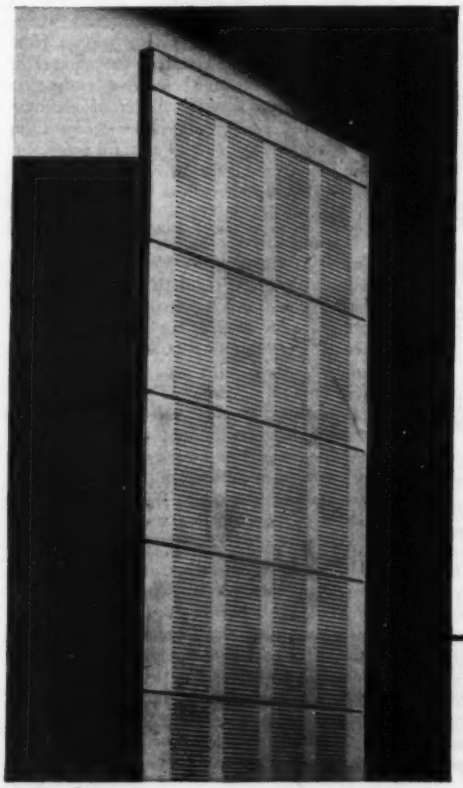

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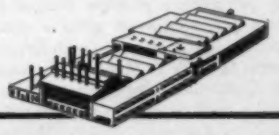

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and the relationship is entirely satisfactory. He also demonstrates clearly that alpha cellulose figures give no clue to filterability of viscose sols. Similarly, he demonstrates that a pulp in which chain length distribution studies show wide heterogeneity (and the presence of large amounts of high polymeric material) gives unfilterable (or difficultly filterable) solutions, and that this heterogeneity is readily detected by the malachite green test. Werner Winkler. *Kunstseide u Zellwolle* 28, No. 5, 153-5 (1950). (In German.)

Manila Hemp Waste in Papermaking

The waste from rope factories, comprising largely manila hemp fiber ("abaca") grade T3 could be pulped by the soda process. In all cases the liquor to fiber ratio was 7:1, and the pulp after being broken up was passed through a 0.014 inch slotted flat screen. The alkali concentrations in these cooks were varied so the 8, 12, 16 and 20% caustic soda (based on the fiber) were used; the maximum temperature was 150 C. and this was maintained for two hours.

Pulp yields passed through a maximum of 54.7% (when 12% caustic was used) tapering off to 49.3% (with 20% caustic). Using constant 16% caustic concentration, the cooking times and temperatures were varied somewhat, but the resulting pulp quality was not very seriously affected, although when longer time periods and higher temperatures were used, or when alkali concentrations were increased, the resulting product was somewhat more resistant to hydration, and for the same degree of hydration had somewhat higher strength properties. Mariano P. Ramiro, *Philippine J. Science* 78, 355-64 (1949). (Through *C.A.* 44, 11090-91, 1950.)

Brazilian woods for pulping

The author reviews reasons for Brazil's delayed pulp production. The principal raw material for pulping—the "Pinho" (Parana pine) was and is used extensively for lumber and no reserves were built up. Suitable trees in the interior of virgin forests were miles from the nearest town, and roads, and railways had to be built, besides the erection of pulping plants.

Parana pine grows in the States of Parana, Minas Gerais, Santa Cataisna and Rio Grande de Sul. The average yield from a log is about 3 cubic meters of wood. The trees usually require 15 years to achieve a log diameter of 25-30 cm. As the trees grow older (50-60 years) there is a marked difference in specific gravity between the heart and sapwood—the sapwood being much whiter and also heavier; the heartwood is dark. Storage is a problem because of possible decay. The wood gives a reasonably satisfactory sulphite pulp (with fiber lengths running as high as 7 mm.). Strength tests with unbleached sulphite parana pine pulps however, indicate that these are weaker than those from European conifers. However, the pulp is very easily bleachable, and (in one calcium hypochlorite stage) a brightness of 85 may be reached. Parana pine can also be pulped by the kraft process, but again, results of strength tests fall below those of European krafts. The remarkable fiber lengths of Parana pulp bring certain drawbacks, especially on further mechanical treatment. Parana sulphite is low in resins. Parana groundwood possibilities are also discussed briefly. Afforestation of the "pine" is outlined. Growth is rapid—and young wood gives the best and most homogeneous products.

An intensive study of deciduous Brazilian woods has just begun. Of the two hundred different species of Eucalyps, at least two (known locally as "Saligne" and "Alba") may be used for chemical pulping. Brazilian forestry is also in its infancy. Communications and technical staffs are lacking, but the extremely rapid growth of Brazilian trees offers marked possibilities for the pulp industry and its conversion products. The author prophesies that in 15-20 years Brazilian pulp will play a role on the world market. L. Rys. Fourth meeting of the Technical Committee on Wood Chemistry, F.A.O. of the United Nations, pp. 120-123 (1949).

Fiberboard studies

Samples of certain wood wastes, such as coniferous wood shavings (I), sawdust, tannin-freed chestnut (II), quebracho wood (III), oak strippings (IV), beechwood strippings (V), as well as straw (VI) were pulped for use in fiberboard.

With the exception of II and III, in which only (a) (the first of the following treatments was omitted), the waste products were pulped by the following procedures: (a) heating with water alone for 4-10 hours at 120-140 deg. C.; (b) aqueous pulping preceded by hydrolysis with 1-1.5% sulphuric acid at 110 deg. for 4-7 hours; (c) with aqueous solutions containing 5-10% sodium sulphite and 2-4% sodium carbonate (based on the weight of waste product) heated 2-4 hours at 120-30 deg.; (d) with aqueous calcium bisulfite (containing 4% sulphur dioxide and 1.3-1.5% lime) heated 1-3 hours at 120-30 deg.; (e) by heating one hour with either 5, 10, or 15% NaOH at 170 deg.; and (f) by heating with sulphite waste liquor three hours at 120-30 deg.

Time required to defiber the material varied but was shortest when 15% NaOH had been used. To the cook made in water alone (a) was also added 10-20% lignin. All pulps were screened, and the initial pulp density was 2.5 to 3%. The wet boards were pressed briefly at a pressure of 20 kg. psi at ordinary temperature and then at 170-80 deg. for 25 mins.

Pulps made by methods (a) and (e) were also pressed one hour at 130 deg. Boards obtained in this way had a density of about 1-1.1 and an average thickness of 3 mm. Tensile strength (cf F. Kollmann *Svensk Papperstidn.* 52,251, 1949) and bending resistance (measured by the Neumann-Schopper test) both of which, given in kg/sq. cm., were respectively as follows: (for II) 280-300 and 220-250; (for III) 180-200 and 130-140; (for I) 350-380 and 280-390; (for V) 130-150 and 90-100; (for IV) 150-180 and 110-120; and (for VI) 280-300 and 230-50. Unimpregnated boards when immersed in water for 30 mins. absorbed 45-50% water and increased about 35-40% in volume. The mechanical properties of the various boards depended on the pulping method used, but varied essentially in the same way for all the raw materials used.

Taking the properties of pulps formed by heating with water (a) alone as a basis, boards made by the various procedures had the following relative tensile strengths and resistance to bending respectively: (a) 100 and 100; (b) 70 and 65; (c) 125 and 130; (d) 80 and 80; (e) (with 5% NaOH) 110 and 105, (with 10% NaOH) 130 and 135, and (with 15% NaOH) 160 and 165. When lignin was added to pulps made by cook (a), the tensile and bending resistance increased somewhat. However, the addition of lignosulphonic acid decreased these values markedly (to 65 and 65). The role of lignin and its failure to be plasticized by hot pressing is outlined.

The above is a contribution from the Experiment Station for Cellulose, Board, and Vegetable and Artificial Textile Fibers, at Milan, Italy. Germano Centola and Francesco Pancirolli. *Ind. Carta* (Rome), 4, No. 4, 39-43 (1950), through *C.A.* 44, 9148 (Original in Italian with abstract in English).

Factors affecting the assessment of pulp wood quality

In any project involving the assessment of woods for pulping purposes, it is essential that the samples examined should be representative of the species and/or of the forest area under survey. They should also be representative of the trees which are then selected as samples. Such assessment can be aided by chemical analysis. Sample selection is described at some length and emphasis is placed on "randomness of selection." From each tree a disc is cut in cross section (about 5 cm. in thickness). Data obtained from mechanical tests on Australian woods have been used in preparing a chart from which it may be ascertained the number of trees to be examined to give a "species mean" within a certain order of accuracy. If pulping studies are to be made, chips of normal length (22-25 mm. for softwoods and 16-19 mm. for hardwoods) are prepared. The thickness however, may be smaller than in practice (possibly 5 mm.).

In analysis, the author points out difficulties in dealing with "kino" the accumulations occurring irregularly in the wood of eucalyps and which interfere with the sampling usually used in the Northern Hemisphere. The "kinos" consume alkali, and an analysis may furnish data on possible alkali consumption in a cook. There appears to be (in eucalypt wood) some highly significant correlations between hot water solubles or alkali consumption on the one hand, and the permanganate number or lignin content of the pulp on the other. Examples are given and a rapid extraction method with 0.4% alkali furnishes valuable information.

Thus by simple empirical determinations on wood meal, it is possible to eliminate much of the labor involved in "scout cooks" in determining alkali requirements for producing, a eucalyptus pulp of specified permanganate number. This technique can probably also be applied to other woods. W. E. Cohen. Fourth Meeting of the Technical Committee on Wood Chemistry, F.O.A., of the United Nations (1949); pp. 59-65.

A paper mill accounts for its selling costs

IRVING C. BARNES

Text and forms of the present article make it clear that, under the related procedure, it is thought worth while to probe in considerable detail into the effectiveness of field sales effort. In addition, there is developed the outline of methods for accumulating and maintaining information on the marginal profit and net profit yielded by company operations in individual product lines and individual cities. It is indicated that executives at various levels receive the results of these analyses in somewhat differing forms.

(Continued from page 1182)

expense is prorated on a direct proportion of dollars of sales. The exhibit features as a final column ratios of expense, by territories, to sales.

There are also two weekly reports, Figure 5, Weekly Report of Orders and Sales, and Figure 6, Weekly Report of Sales, Shipments, and Price. These give a quick, accurate and comprehensive weekly summary of the related factors. Comparisons with budgets and previous years' activity permit constant checking of actual results with expectations.

In working up shipment data necessary for the weekly reports, the company has devised a method of assembly of information which serves several purposes. The daily shipments are accumulated by pounds, dollars, lines, and cities through the use of peg board, punch card or other means, depending on the volume of items. These figures are summarized in detail on a form such as is shown in Figure 7, Sales Analysis. This provides a column for the past two years' sales, a column for the year and period budget, and columns for each of thirteen four-week periods with a six-period and year total. Copies of these reports are sent to the salesmen each period and are returned to the sales statistical department for posting. This give each salesman a detailed picture of his territory and an up-to-date record of the purchases of each of his customers by lines.

The seven reports which have been briefly described, provide the necessary information for formulating plans, controlling expenses and checking results. The frequency of these reports permits the enlargement, reduction, or changing of plans as current conditions warrant. The variations from schedules or

	Territory_____ Page_____													
Periods—	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
City and Customer	S A	S A	S A	S A	S A	S A	S A	S A	S A	S A	S A	S A	S A	S A
Detroit—No. of Days.	4 3	4 4	4 5	4 4	— —	4 3	4 3	— 3	4 2	4 2	4 5	4 4	— —	40 38
Detroit														
No. of Merchant Calls	4	6	2	7	4	5	—	3	2	9	5	6	3	56
No. of Merchant Cost. Calls	7	2	—	4	1	2	4	1	—	4	2	2	—	29
Customer No. 1...	2	1	—	3	1	2	—	1	1	3	2	1	1	18
Customer No. 2...	1	3	1	2	2	2	—	1	—	4	1	4	1	22
Customer No. 3...	1	2	1	2	1	1	—	1	1	2	2	1	1	16
Salesman A—Territory 1														
Number of Days....	10 9	15 16	15 18	20 18	20 18	20 22	10 12	15 12	18 16	18 17	18 20	18 16	18 20	215 214
Number of Merchant Calls	15	33	44	39	38	37	31	41	37	43	53	47	52	510
No. of Merchant Cost. Calls	19	67	67	89	94	51	77	51	77	65	64	57	63	841

Fig. 1—Record of calls on customers

Territory	Sales		Expenses						Ratio Expense to Sales		Personal Administrative Expense		Total Sales Expense		Ratio Total Expense to Sales	
			Period			Year to Date										
	Period	Year to Date	Salary & Trav. Expense	Office	Total	Salary & Trav. Expense	Office	Total	Period	Year to Date	Period	Year to Date	Period	Year to Date	Period	Year to Date
1 - 2																
3																

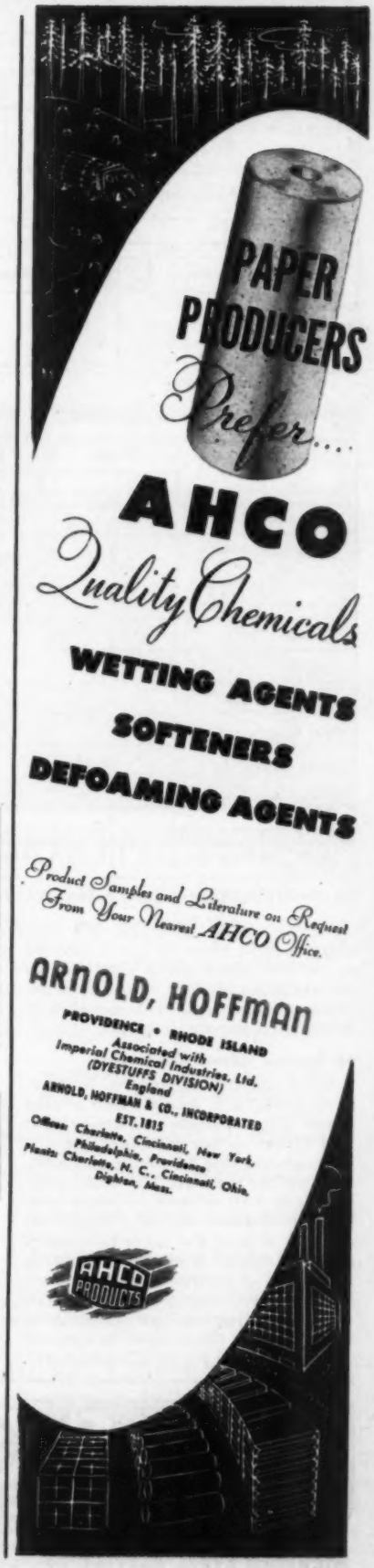
Fig. 3—Sales and sales expense by territories

CUSTOMER — SALES TERRITORY

NAMES OF LINE	SALES	SALES — BY PERIODS														
		SALES	Last Year	Budget	1	2	3	4	5	6	Total 1 - 6 Periods	7	8	9	10	11	12	13	TOTAL

Fig. 7—Sales analysis

Fig. 8—Profit analysis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Territory and Salesman	Days with Trade				Calls Made							
	Period		Yr. to Date		Period				Year to Date			
	Scheduled	Actual	Scheduled	Actual	Mar.	Mar. Last	Total	Avg. Calls per Day	Mar.	Mar. Last	Total	Avg. Calls per Day
#1												
#2												
#3												

Fig. 2—Report of sales activity . . . . . .

Territory and Salesman	Sales								Lines Placed		Lines Dropped	
	Period				Year to Date				Per.	Yr.	Per.	Yr.
	Budget	Act.	$ Yr. D or E over Budg.	$ Yr. D or E over 19	Budget	Actual	$ Yr. D or E over Budg.	$ Yr. D or E over 19				
#1												
#2												
#3												

. . . . . and results

Period No. _____ Ending _____ Salesman

	Period		Year to Date		
	Budget	Actual	Budget	Actual	Scheduled for Year
DAYS TRAVELED					
FIELD SELLING EXPENSE					Per Diem Budget
Travel					
Railroad					
Pullman					
Plane					
Auto, Taxi, etc.					
Total Travel					
Living Expenses					
Entertainment & Misc.					
Total Expenses					
General (Registration fees, etc.)					

Fig. 4—Days traveled and field selling expenses

ORDERS

WEEK ENDING _____

	Normal Capacity	This Week						Total for Year to Date					
		This Year		Last Year		%		This Year			Last Year		
		Pounds	% of Quota	Pounds	% of Quota	+ or -		Pounds	% of Quota		Pounds	% of Quota	+ or -
TOTAL													
"A" Mill													
"B" Mill													

SALES

	This Week					Total for Year to Date					
	Budget for Week	This Year Sales	% of Quota	Last Year Sales	% + or -	This Year Budget	This Year Sales	% of Quota	Last Year Sales	% + or -
TOTAL										
"A" Mill										
"B" Mill										

Fig. 5—Weekly report of orders and sales

Week Ending _____

	Week				Total for Year to Date			
	Budget	Actual	% of Budget	$ +D over last year	Budget	Actual	% of Budget	$ +D over last year
Sales								
Pounds Shipped								
Price per Pound								

Fig. 6—Weekly report of sales, shipments, and price

Line or City	Sales	Profit Before Overhead Charges		Net Profit	
		$	% to Sales	$	% to Sales

Fig. 9—Analysis of profit

budgets indicate where the plan is exceeded or not met. Questionable items can be analyzed readily from supporting reports and prompt arrangements made to correct or to provide for unexpected situations.

An eye on advertising costs

Advertising, like field selling, is an expense which has a decided effect on sales volume and on profits. Advertising costs must be kept in line with sales, but it is also important that advertising be concentrated on the lines and cities which profit most from it. It is easily conceivable that the cost of advertising in a certain city might be so great that no profit remained from the volume of business done there. Distribution of advertising must, therefore, be as carefully budgeted as are sales. For this reason advertising costs are set up by the XYZ Paper Co. in detail by lines and cities and checked periodically against budgets. The assembly of costs by line for sample books, folders, direct advertising, etc., is handled much as factory costs are handled. Proper accounts are opened for lines or items. Labor, material and overhead is charged to them.

However, distribution of this type of expense to cities and lines is difficult. Moreover, the value of the advertising may last longer than one year and an average must be worked out as to the length of time a sample book, for instance, will be useful, including the usefulness of reprintings. This is necessary to avoid apparent fluctuations on expense from year to year, caused by charging in one year the cost of advertising material having a longer life.

Profitability of lines and territories

It is safe to assume that, in many industries as in the paper industry, particular product items or lines are carried which do not yield a profit when all costs have been properly charged to them. These lines are carried to satisfy the demands of the trade or to meet competition. When the productive capacity of a mill or plant is far below normal, these lines, although they show little or no profit, do help to absorb overhead and thus sustain the financial condition of the company. The situation is true, of course, only as long as equipment is operating at less than full capacity. When production increases, these lines or items, if made, occupy equipment which otherwise might be producing on profitable business and may possibly be fit candidates for elimination.

As a measure of results in this connection, *net* profit by cities or salesmen would be inadequate, for such a measure would fail to show the contribution to the financial stability of a company made at times by a volume of low profit margin product. If

MISCO
STAINLESS STEEL CASTINGS
for all equipment exposed to corrosion by sulphite acids or other corrosive agents
MICHIGAN STEEL CASTING CO., DETROIT 7, MICH.

CARTHAGE MACHINE CO.
• • •
Machinery for Ground Wood and Chemical Pulp Mills.
CARTHAGE, NEW YORK

low profit or non profit lines were summarily dropped, the company would have a greater underabsorbed expense and, consequently, a lower net profit. A proper comparison of the results of operations by cities, territories, or lines for this purpose is dependent, therefore, on the development of another indicator. The indicator as set up in the plan of the XYZ Paper Co. shows the amount of fixed expense absorbed by the line or city. To put this another way, the "index" is a statement of *profit before overhead charges* and shows the amount remaining from operations in each city, territory or line to reduce overhead after all direct costs for manufacturing and selling have been met.

Used together, the two types of statements, i.e., product (city, territory) net profit and product (city, territory) net profit before overhead charges, provide a basis for determination of sales policy and activity. It is essential to consider profit when planning rather than sales volume, for profit is the real objective of the company. It often happens that a city with low sales volume rates in high profit lines will yield the company more than a city with high sales in low profit items.

Reporting procedure keyed to profitability tests

The sales control plan develops a report which shows complete costs and profit figures and which may be condensed as is shown by the illustrative forms to be cited. The sales executive is provided with a record of the complete cost, profit, and profit before overhead charges on all lines. This may be (and currently is) accumulated from the time the line originated, until it is dropped. It has great value in determining sales and advertising plans. Through this information, it becomes apparent when a line has served its usefulness and should be discontinued and also what contribution a low profit line or item is making to the financial condition of the company. These reports may be prepared as often as needed. In the case of our hypothetical company, twice a year is the present policy although annually or quarterly might be practicable in some cases.

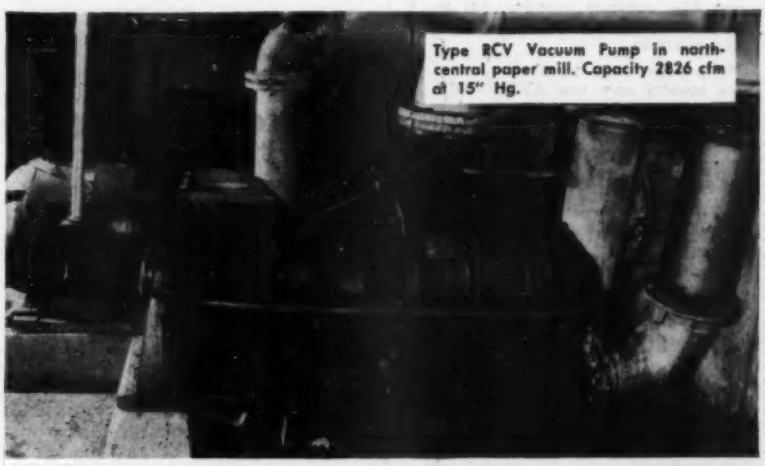
Figure 8, Profit Analysis, shows the form developed to assemble the data which makes up this report, in an orderly and logical manner. Figure 9 is a condensed form on which the results may be summarized for groups of lines or cities, as may be desired. A brief explanation is given in the succeeding paragraphs of the items called for by the detailed form and also some explanation of the method used in grouping the items. It will be noted that Figure 8 includes three types of information related to: (1) sales, (2) direct costs, (3) and overhead charges.

The market factor column indicates the volume of sales which may be expected from each city. It is used only in the preparation of city records and is arrived at after a careful study by the sales research department, in which local conditions as well as general business conditions receive consideration. The remaining columns in the sales section are self-explanatory. They relate the sales of the line or in the particular city to total sales (in the case of cities, house accounts are excluded in order to deal only with field selling), show physical and dollar volume of sales, and average realization per pound of product.

The direct cost section of the report is constructed to display the items necessary to be deducted from sales to give profit before overhead charges and thus show relative contributions of the various lines and cities to fixed costs and profits.

Advertising costs, including overhead, are distributed to lines and cities as has been described. The "days" column under field expense is information data accumulated from Exhibit I and is used only on the city sheets. It shows the number of days a salesman spends in each city for the period covered by the report. Field selling expense dollars are given as in Figure 4 (not including selling administrative, which is not affected by the volume of sales). For the city report, the item of freight is the applicable rate multiplied by the pounds shipped to the city in question. Freight in the line report, is based on the distribution of the line by cities, multiplied by the various freight rates to those cities. Shipping costs are charged on a flat hundred weight rate based on pounds shipped. Sales allowances represent actual allowances as made, by line and city. Sales discount is prorated on percentage of dollar sales.

To arrive at full costs related to line or city, it is necessary to include a cost of sales figure. Hence standard cost prices repre-


Type RCV Vacuum Pump in north-central paper mill. Capacity 2826 cfm at 15" Hg.

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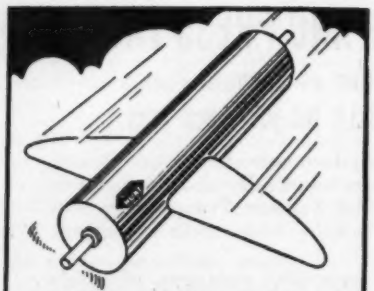

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senting the standard inventory value (less shipping cost) of each line, as set up in the standard cost division of the factory control department, are made use of. These costs (after deducting the fixed overhead charges) are applied to the pounds shipped for each line to get the cost of goods sold total. For the city records the various lines sold are priced separately and accumulated.

The remainder of the standard inventory value (the fixed overhead charges which were deducted above) is included in manufacturing overhead in the overhead charges section of the form. Included here also are sales overhead and additions and deductions from income. Both categories are prorated on the dollar sales.

The methods just described, which include preparation of the set of seven reports on sales activity and development of marginal and net profit data by lines and cities has been in operation in part or whole for the past several years and has proven very effective in the proper control of selling and distributing costs. While the plan has helped to reduce per unit costs of selling, it has also served as a guide to the more important objective of increasing the volume of business—particularly more profitable business.

Convention Paper . . . Abridged

Better quality in coated offset papers*

HENRY NENDORF
Coating Superintendent
Rex Paper Co.

Consideration of a coated paper can not be divorced from its raw stock properties. From the standpoint of the paper coater, in addition to necessary strength characteristics, the following raw stock properties are extremely important:

(1) *Type of fiber*—The paper coater prefers a sheet with short fibers; the shorter, the better. As far as he is concerned, the longer fibers are bad. They are necessary for strength, fold, etc., but they complicate the coating problem.

(2) *Coating color receptivity*—The fiber must be uniformly receptive to coating color. Old paper stock is outstanding in this respect.

(3) *Raw stock surface*—The raw stock surface should be smooth, free of fuzz, and of uniform density. Smoothness should be obtained through uniform formation and wet end treatment. Smoothness obtained through calendering alone is temporary. It will disappear as soon as the coating color is applied with consequent swelling of the fiber.

Two questions come to mind for consideration. (1) What qualities are imparted to a base sheet by coating? (2) What pitfalls should be avoided in producing a high quality coated paper for offset printing?

A high quality coated paper for offset printing should incorporate most of the following characteristics:

(1) High order of smoothness, (2) Opacity, (3) Water Resistance, (4) Uniformity, (5) Freedom from curl, (6) Minimum tendency to adhere to rubber blanket, (7) High pick resistance, and (8) Absence of materials inhibiting drying of inks.

Papermakers in the Kalamazoo Valley feel that they are in an excellent position to exercise the care and time necessary for the production of the highest quality coated offset paper. Furthermore, they feel that no method of coating as yet developed has equalled the efficient and desirable action of brushing a coating color into the raw stock.

To make a comparison: We know that our houses can be painted much more rapidly and cheaply by spray or roll application: but, for a quality job, we still use brushes.

Specifically, how do we incorporate the desirable properties in a sheet of coated offset, assuming that the raw stock is of the smoothness desired?

Proper choice of pigments, adhesives, solids level and flow modifiers, is an essential part of the coaters know-how. Machine speed, rate of drying, control of brushing rate and pressure complete the picture.

Opacity data on pigments and pigment-adhesive combinations are readily available. Opacity increases as coating weight increases. Crushing of the coating must be avoided to prevent transparentizing effects.

The coating adhesive is the major factor in determining the water resistance of coated paper. This field is too large and too controversial to be discussed at this time.

Close control over coating ingredients, close supervision of coating and finishing operations, and proper inspection of finished product are essential in producing a uniform paper.

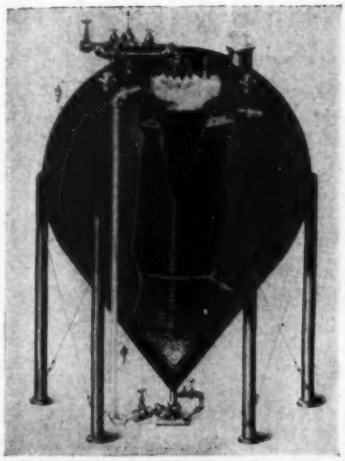
Factors which can affect curl tendencies of paper are too numerous to cover in this short discussion. The papermaker and coater must work in close co-operation to produce a curl-free coated sheet.

The tendency of the sheet to adhere to the rubber blanket is minimized by a not too flimsy web. Also, pigments and adhesives must be chosen with sticking tendencies in mind.

The pick resistance required will be affected markedly by smoothness, water resistance, raw stock, printing speed, and degree of sticking to the rubber blanket.

(*) Abridged from a paper presented before the 31st annual convention of The American Pulp and Paper Mill Superintendents Association, Inc., held at the Edgewater Beach hotel, Chicago, June 8-10, 1950.

The Paper Industry New Products



Sedimentation Tank

Conventional sedimentation tanks for hot process water softeners have been cylindrical in shape with dished top and conical bottom, requiring heavy reinforcement and extremely bulky steel construction. The Graver Sphericone is a hemisphere mounted on an inverted cone. Thus there is a uniformly increasing area from bottom to top, which is necessary for the correct functioning of the tank, plus uniform stress distribution, making most efficient use of materials and tank space. A lighter, stronger tank using less steel is the result.

The hemisphere contains raw water, steam and chemical inlets, spray heater, deaerator and treated water collector, while the downtake, sludge bed and rising zone are located in the inverted cone. The design is especially efficient in large-capacity sizes. Graver Water Conditioning Co., Dept. 146, 216 W. 14th St., New York 11, N.Y.

Flow Meter

A new variable area flow meter has been designed especially for handling caustic streams. All parts of the meter in contact with the fluid are made of nickel. A steam jacket surrounds the liquid passages through the meter. The one moving part, a flow-sensitive float, is entirely confined within the liquid stream, with no bearings or seals in the system. Meter is available with remote instruments or with integral recordings. Sizes range from ½ to 300 gpm. Fischer & Porter Co., Hatboro, Pa.

Electro-Hydraulic Motor Valve

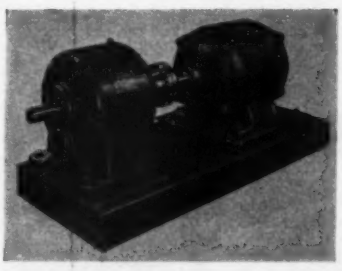
The "Type O Sarcostat" hydraulic motor valve is used for open-and-shut control. Two-wire, normally closed, actuated by hydraulic power, it operates single seated valves up to 1½ inches or double seated valves up to 4 inches at 125 psi. It does so by direct thrust, without the use of pilots, gears or levers.

When the full stroke is used, standard valves will open in 60 seconds and close in 10 seconds. Thus they are ideal for the remote control of steam or water branch mains for space heating systems, since the gradual opening protects the piping and the quick closing prevents overheating. They will also handle oil, gas, and air. Valve bodies are of brass or iron. Various types are available. Sarco Co., Inc., 350 Fifth Ave., New York 1, N.Y.

Rotary Shaft Seals

A complete line of mechanical seals for rotary shafts is now offered by The Garlock Packing Co. Standard designs include Package Seals, Chevron-Type Seals and "O" Ring Seals. Specially engineered seals can be made for specific applications.

Sealing is effected by leakless contact between carefully lapped mating surfaces. One of these elements rotates with the shaft and the other is stationary. *The stationary element does not contact the shaft.* Thus there is no wear on the shaft, and trouble-free operation is assured. For economical, leakless handling of liquids in any rotary shaft operation. Garlock Packing Co., Palmyra, N.Y.



Gear Drive and Motor

The "Motogear" consists of an enclosed helical gear drive with a separate standard motor, flexibly coupled and mounted on one welded steel base plate. A movable plate between motor feet and welded base plate provides for convenient adjustment, should shaft realignment be necessary for any reason. Input and output shafts are concentrically in line.

The helical gear drive used is like that employed in the Link-Belt "Gearmotor," but on the "Motogear" the motor is coupled to input shaft and mounted on a base plate instead of being integrally secured to side of drive. "Motogears" are built in a variety of sizes, in double or triple reductions, and in a wide range of ratios and hp. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

Power Hand Trucks

The design of these two new hand trucks features a wheelbase and turning radius claimed to be shortest of any truck of this type. Both models are rated up to 6000 pounds load capacity. The battery-powered model, called the Electro-Lift, has a compound motor which develops 1¼ hp., and features automatic acceleration and braking. The gasoline engine model with hydraulic pump and motor, known as the Hydro-Lift, is said to furnish the smoothest drive of any hand truck in the materials handling field. This model provides ample reserve power, and an eccentric pump makes it impossible to stall the engine. Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.

Air Motors

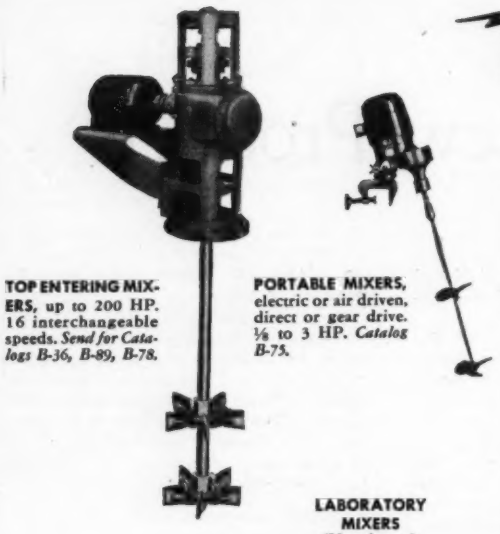
The "Super Speed" air motor builds an explosive action that utilizes air pressure to produce force much more powerful than that obtained from standard air motors. It is suited to riveting, staking, forming, stamping and other operations. It comes in four models, each with stroke lengths of 4, 6, 9 or 12 inches, and can be ordered with high speed piston rod travel on the advance or retract stroke, or both.

The speed of the piston rod movement in the "Super Speed" is six to ten times the maximum speed of a standard air motor or air cylinder. The power developed depends on the air pressure applied and the load in pounds on the end of the piston rod. The Bellows Co., Akron, Ohio.

Teflon Packing

A new braided packing, known as "Palmetto 1330," is prepared from chemically pure blue asbestos yarn, each strand of which is thoroughly impregnated with Teflon. The yarn is then braided tightly to avoid leakage through the cross section.

Because it may easily be cut or formed to any required packing size, "Palmetto 1330" offers complete adaptability as a storeroom item to meet all size packing requirements. It is designed for difficult packing service, particularly in the chemical field against corrosive fluids and solvents. It can be supplied in sizes from ⅛-



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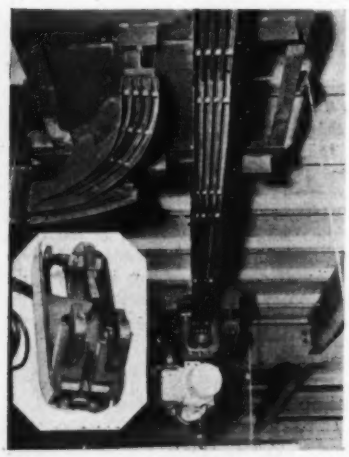
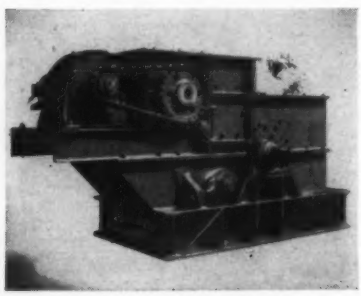
in. braid up, and is put up on 1-lb. spools, 5½-lb. and 13-lb. boxes, or 25, 50 and 100-lb. reels. Greene, Tweed & Co., North Wales, Pa.



Tramrail Electrification System

Installed directly below the tramrail track tread, Ohio Tramrail Shielded Electrification is said to offer operating and maintenance personnel more complete protection from electrical hazards commonly encountered with open, unprotected conductor bars. Arcing and flashing of conductor bars is minimized by use of large-area shoe contacts with individual springs in each shoe. Chance for casual contact is minimized by combining the safer under-the-track location with a compact 16-gauge sheet metal housing which shields conductor bars and is open only at the bottom. The insulated conductor bars are of copper-bearing mild steel which affords double the current carrying capacity of mild steel with greater resistance to pitting, corrosion and oxidation.

These shielded systems are factory fabricated in 10-ft lengths for erection on the job. Tack welds on 3-ft., 4-in. alternate centers are used to fasten the sections to the bottom of the track. Forker Corp., 2122 Random Road, Cleveland 16, O.



Improved Hammermills

The 1951 line of Bulldog Moving Breaker Plate Hammermills features more accessible controls, heavier shafts with antifriction bearings, and special analysis steels used in construction for greater wear and less maintenance. It is claimed that the new hammermills can increase capacity of properly prepared rock for compartment ball or rod mills as much as 30 per cent, with no increase in power of ball mills. The Bulldog Hammermills are designed for crushing sticky or high moisture materials. Hammermills, Inc., Div. of Pettibone Mulliken Corp., 4737 W. Division St., Chicago 51, Ill.

Coating Attachment

A multi-purpose coating attachment called the "BTC" is fitted with special brackets permitting mounting in any position—for top, side or underside coating. The "BTC" is particularly suited for applying adhesives in widths up to 21 inches to webs running at any speed. It can be either self-powered or powered by other equipment. It is equipped with a control for applying adhesives in any required amount. Removable reservoir and coating rollers permit thorough cleaning. Potdevin Machine Co., 1285 38th St., Brooklyn, N.Y.

Teflon Gaskets

An extensive new line of gaskets, known as the "Korda" line, is fabricated of Teflon. The gaskets are in different forms, including both solid and Teflon-jacketed gaskets. Tested in over 200 different strong acids, caustic alkalis and solvents, Teflon is completely unaffected by all except molten sodium and fluorine at elevated temperatures and pressures.

The gaskets are available in hard, medium and soft grades and are suitable for all metal

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and non-metallic flanges. Technical service on the design, sizing and specifications of gaskets to meet all standard and many specialized needs is available from the manufacturer. Chicago Gasket Co., 1275 W. North Ave., Chicago 22, Ill.

Junior Dehumidifier

The Haertel Dehumidifier "50" has a ½ hp. hermetically sealed "Freon" condensing unit. It has a maximum 24-hour capacity of 50 pounds of water removal from the air, which is claimed to be a 26 per cent increase in efficiency over conventional dehumidifiers. Recommended for paper warehouses, the device is also available in larger sizes than the model "50." Heat recovery and automatic disposal of the condensate removed from the air are optional. Walter Haertel Co., 2840 Fourth Ave. So., Minneapolis, Minn.

Stretch Meter

The percentage stretch or shrinkage of materials being processed through pairs of rolls turning at different speeds is indicated and automatically recorded by the new Tag-Western recording speed-ratio tachometer. Operated by two tachometer generators driven by the respective rolls, the instrument consists essentially of a specially developed ratio recorder. Various calibration ranges and chart graduations are available. Tagliabue Instruments Division, Dept. 414, Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N.J.

Paper Cutter

The Series "V" Model 52-T-76 makes it possible to cut paper sizes up to 76 in. without installing an extra large cutting machine. It is a further development of the Lawson electronic spacer cutter with hydraulic clamp. The rear table has been extended to handle the larger sheet.

It operates at 43 strokes per minute and, because of its size, saves floor space and cuts power consumption. E. P. Lawson Co., New York, N.Y.

Concrete Saw

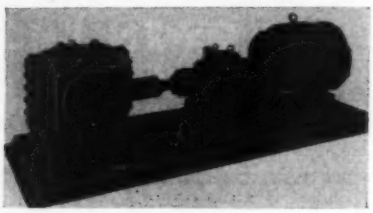
These portable powered saws utilize metal bonded diamond blades for sawing concrete with limestone, flint or granite aggregate, as well as asphalt. It is claimed they can cut any concrete or asphalt flooring for such uses as expansion joints or patchwork for repairs of plumbing, electric wiring, and paving. Cuts are said to be straight and smooth, provide finished edges for concrete pouring, and limit radial fracturing when breaking.

Gasoline or electric powered models are available. The Model CHD makes is possible for present owners of Clipper Model HD's to convert their masonry saws for concrete sawing. Clipper Manufacturing Co., Concrete Saw Div., Dept. K, 2800 Warwick, Kansas City 8, Mo.

Straw Bale Breaker and Cutter

This machine speeds up the processing of straw for incorporation into strawboard and other papers. It feeds the wire-bound bales to the bale breaker, where the wires are removed and the straw is broken out and automatically fed to the cutting machine. There it is reduced to the fineness required for any type of paper or strawboard, usually to lengths of about three or four inches. From the cutter the straw goes directly to digesters to be treated in the usual manner.

It is claimed that cut straw is produced at the rate of 1000 lb. per minute, in one straight-line operation. This new development is part of the program sponsored by the U. S. Government and paper manufacturers to improve the processing of straw. Taylor, Stiles & Co., Riegelsville, N.J.



Steam Jacketed Pump

This steam jacketed herringbone gear pump is made for handling viscous liquids at high temperatures. The steam jacket completely covers the internal parts. The inlet, outlet and cover flanges are cast integral with the pump base, and rigid housing construction eliminates any possibility of distortion due to pipe line strain or misalignment.

All gears are case-hardened, press-fitted and keyed to the shaft to prevent lateral or radial movement. To prevent slippage, the gear teeth have a specially designed high

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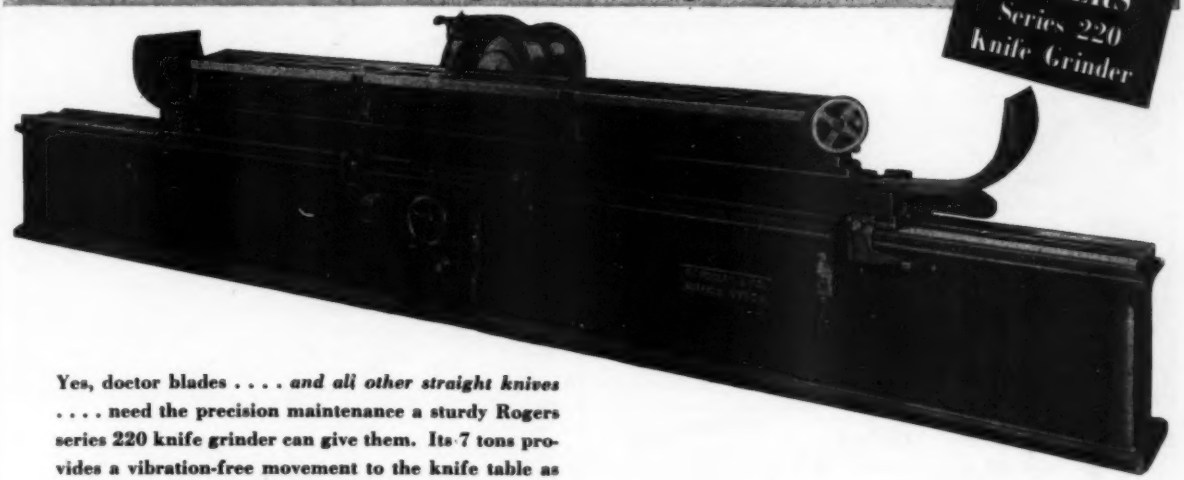

Yes, doctor blades . . . . *and all other straight knives* . . . . need the precision maintenance a sturdy Rogers series 220 knife grinder can give them. Its 7 tons provides a vibration-free movement to the knife table as it glides over extra wide, friction free, machined ways. Table speeds from 45 to 75 fpm provide for rough and finish grind,—and, so, preserve the life of your knife. The cool, segmental grinding wheel plus automatic coolent system safeguard the temper of your most expensive knives. Yes, these features, and many others, developed through over 63 years of grinding experience will give you *sharper* knives that stay sharp *longer*. Write today for further information.

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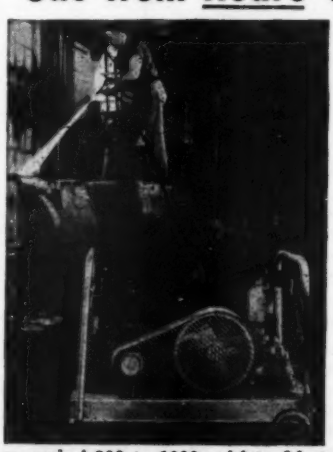

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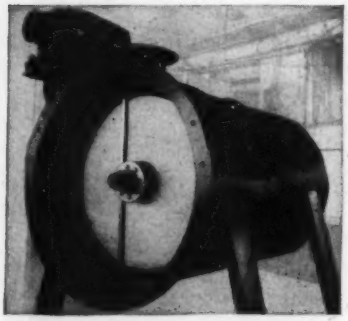
pressure angle tooth. The pumps are available in Meehanite B, cast steel, bronze or special alloy case. Internal parts are built to specifications. Shutte and Koerting Co., Dept. P-A, 12th & Thompson Sts., Philadelphia 22, Pa.



Self-Cleaning Filter

This new industrial filter is constructed with a series of circular discs mounted on a hollow center shaft and enclosed in a horizontal cylindrical pressure tank. Each disc is covered by a synthetic cloth sealed around the edge. When cleaning is necessary, an arrangement of nylon brushes set between the filter discs and connected to a revolving brush cage sweeps the surfaces clean. All matter that has accumulated on the discs drops to the bottom of the filter and is washed out by water flushed through the filter to the outlet drain.

Known as the Model SC series, this filter is especially adaptable for use with any solution where water can be used to flush the filter aid. The series is available in a wide range of capacities, and can be made of corrosion resistant materials throughout. Sparkler Manufacturing Co., Mundelein, Ill.

Elevator Bucket

"Uni-Cast" buckets are cast integrally with a single link of chain. They cannot loosen, and are easy to replace. There are no raised surfaces or projecting bolt heads on the inside of the bucket to retard discharge, and the front edge and corners are reinforced to withstand severe abrasion while loading. The bottom of the bucket is flat to prevent arching. Made of Beaucalloy, a heat-treated alloy steel, the bucket is said to be exceptionally durable. Made in five sizes, 8 x 5 in., 10 x 6 in., 12 x 7 in., 14 x 7 in. and 16 x 8 in. Beaumont Birch Co., 1505 Race St., Philadelphia 2, Pa.

New Product Briefs . . .

▶ ROTARY LETTERPRESS — This heavy-duty press incorporates an entirely new concept of interchangeable color units, permitting wash-up, etc. without press down-time. Each individual color unit is mounted on roller casters for easy extraction, and an auxiliary traveling bed removes the color unit from the press. Champlain Co., 88 Llewellyn Ave., Bloomfield, N.J.

▶ LINING AND FLOORING PAINT — Carbo-Kote 6020 is a thick protective coating for tank and duct linings, and for protection of floors and equipment. It has a solids content of 100 per cent but is free flowing during application. Said to be acid, solvent and alkali resistant. Carboline Co., 7603 Forsyth Blvd., St. Louis 5, Mo.

▶ PACKAGING MACHINE — The Model E 1951 Morpac wraps or bands ream paper, pads, hard-bound books, etc., from 5½ by 7½ in. to 10 by 15 in., in packages up to 5 in. high. One operator feeding the machine can produce 1000 packages per hour. Lynch Corp., Packaging Machine Div., Toledo, O.

▶ TRACTOR—Only 44 in. long, the Load-Mobile tractor is designed for jobs where space is limited. It is adaptable to many hauling and lifting jobs, and operation is flexible. Two models have 3000 lb. and 5000 lb. capacity. Market Forge Co., Everett, Mass.

▶ SAFETY SWITCH—For use in explosive locations, this switch is hermetically sealed and operated mechanically by a lever. No spark is possible. Switch is available with either push button or selector knob. Panalarm Products, Inc., 7212 N. Clark St., Chicago 26, Ill.

▶ GLOSSMETER — For measuring the sheen of interior wall paints and camouflage paints, this new glossmeter measures 85 degree specular gloss according to Method 6211.1, Federal Specification TT-P-14lb. The instrument consists of exposure head with lamp, lens and sensitive light meter. Henry A. Gardner Laboratory, 4723 Elm St., Bethesda 14, Md.

▶ OUTLET BOX — Type 6005 outlet box, when used with accessory connector types 106 and 115, gives waterproof, weatherproof and pull-out proof power connections. Permits five outlets from one inlet. Inlet rated for 6000 watts, and each outlet for 1500 watts. Equipment and Service Co., 6815 Oriole Dr., Dallas 9, Tex.

▶ WATERPROOFING — Lipton All-Seal Waterproofing, a clear, penetrating liquid, is said to retard weathering of exterior and interior masonry surfaces of all kinds, as well as woods and canvas. Seals against water and retards dirt and grease from entering. Recommended by the manufacturer for warehouses. Progressive Enterprises, 1001 N. Vermont Ave., Los Angeles 27, Calif.

▶ BARREL PUMP—This pull type pump for filling cans with light liquids from barrels fits into the barrel bung and holds securely and snugly to the opening. An adjustable bushing locks pump into openings of 1½ and 2 in. on 15 to 55 gal. drums. Model GS No. 44. General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa.

▶ GLOVE RECONDITIONING — A new service claims to salvage over 80 per cent of discarded work gloves by thorough renovating, cleaning and patching. A free trial plan is available. U. S. Industrial Glove Corp., 9350 Roselawn Ave., Detroit 4, Mich.

▶ PALLET LIFT—This truck, said to be the only aluminum alloy pallet lift truck available, will lift wherever a man can stand. It features special wheels that automatically retract when the forks are lowered. Market Forge Co., 25 Garvey St., Everett, Mass.

▶ PROOF PRESSES—These electric presses are built for rotogravure proofs for the laboratory and for foil, film and paper converters. They prove with gravure and aniline inks and come in widths from 4 in up. Inta-Roto Machine Co., Richmond, Va.

▶ CHLORINIZER—The HCVS high capacity visible flow Chlorinizer is a simplified apparatus for metering and controlling chlorine gas feed by manual, semi-automatic, or automatic proportional means. It will provide chlorine to three points of application and also will select the sequence of point of application. Builders-Providence, Inc., 345 Harris Ave., Providence 1, R.I.

▶ TIERING TRUCK—The Model 230 Jeep fork truck has a maximum fork elevation of 130 in. and is activated by a single cylinder, low pressure hydraulic lift with patented cross suspension. Mercury Mfg. Co., 4102 S. Halsted St., Chicago 9, Ill.

▶ ENAMEL—The 1951 color line of "Totrust" enamel, a rust-inhibiting paint, matches almost thirty equipment manufacturers' original colors. The colors can also be used for identification of pipes and for the machinery safety code. Color chip cards are available. Wilbur & Williams Co., Greenleaf and Leon Sts., Boston 16, Mass.

▶ BOILER VALVE—A Straightway "Y" type valve has been added to this company's line of boiler blow-off valves. It is built in strict conformance to ASME Boiler Code. In three sizes for pressures to 600 lb., the valve is made of cast iron or cast steel with monel metal head and seat. Everlasting Valve Co., Dept. 31, 49 Fisk St., Jersey City, N.J.

▶ GRINDING WHEELS—Type "79E" bond for vitrified grinding wheels operating at speeds up to 6000 surface ft. per minute is said to assure smoother, faster cutting action and longer production time. Full information and free samples are available. Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago 7, Ill.

▶ REGULATOR — This regulator controls volume of flow to an evaporator handling a water solution of animal glue. It requires no air or electric power. Various sizes control flow from 0.1 to 300 gpm. W. A. Kates Co., 430 Waukegan Rd., Deerfield, Ill.

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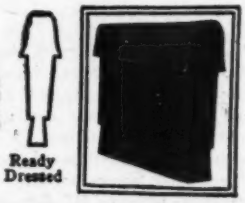

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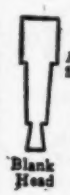

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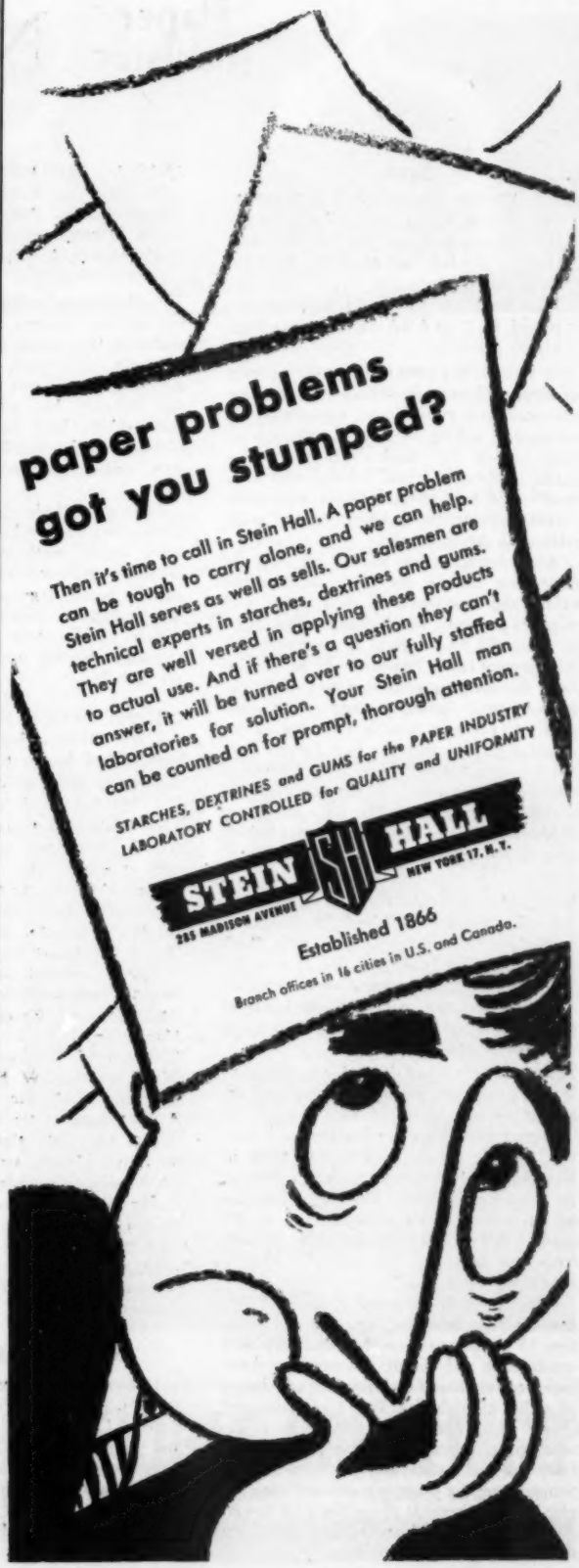

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The Paper Industry New Literature

Books

SOURCES OF ECONOMIC INFORMATION FOR COLLECTIVE BARGAINING, Research Report No. 17. By Ernest Dale. Published by American Management Association, 330 West 42nd St., New York 18. 6 x 9. 11 pages. Paperbound. $2.75 to AMA members; to others, $3.75.

This volume, the report of a study on management and labor in collective bargaining, examines data available to negotiators and arbitrators seeking a factual approach to wage setting. The book explains and discusses in detail the four criteria most commonly used in determination of wage rates —cost of living, productivity, "going" wage rates, and ability to pay.

After listing many sources of data on these four criteria, the book analyzes the values and limitations of their usage, and suggests problems which must be considered in using the four criteria as guideposts for management-labor negotiations. In conclusion, the book suggests that cost of living, productivity, "going" wage rates, and ability to pay now provide a framework for negotiations but that the four factors have not yet been developed and used enough to give concrete answers to any right way of settling wage disputes. The pulp and paper industry is one of those groups for which data on the four criteria is included.

MODERN REFRACTORY PRACTICE, third edition. Published by Harbison-Walker Refractories Co., Farmers Bank Building, Pittsburgh 22, Pa. 8 x 11. 440 pages. Free to users of refractories, to libraries, and to department heads of universities or technical schools; nominal charge to others.

The second edition of this volume, published in 1937, was completely rewritten and increased in size from 296 to 440 pages, to keep pace with refractory developments since 1937. Scale drawings of twenty types of furnaces which illustrate modern industrial practices are included. Drawings show details not only of the furnaces, but of the types of refractories generally used; alternate types are suggested for special operating conditions.

One chapter is composed of practical suggestions regarding the care, use and selection of refractories; another discusses arch construction and design, placement of skewbacks, calculation of arch stresses, and design of arches of high rise, Part 1 of a two-part chapter on properties of refractories is devoted to a discussion of mineralogy of refractories and to stability relations at high temperature; the other is concerned with the physical and chemical properties with special reference to those which are most significant in the utility of refractories.

ANNUAL PROCEEDINGS OF FOREST PRODUCTS RESEARCH SOCIETY, fourth edition. Published by Forest Products Research Society, Box 2010 University Station, Madison, Wis. 500 pages. $8.00.

This cloth-bound volume contains all 44 of the technical papers and discussions presented at the Society's fourth annual meeting held in Portland, Ore., in June, 1950. Retaining the format of the three preceding volumes, but with more illustrative material, the book contains 400 pages of technical data, official Society business reports and a complete Society membership list.

Contents include shipping container developments and problems; pulp and pulpwood supply developments; quality control in forest products; manufacture of wood particle board; logs, sawmills and lumbering; soft-wood plywood industry review. Papers on furniture manufacturing, high frequency heating and wood preservatives are included.

CHIPPED WOOD PRODUCTION AND USES, Bulletin No. 33, January, 1951. Published by Northeastern Wood Utilization Council, Inc., P.O. Box 1577, New Haven 6, Conn. 9 x 6. $2.00.

This book is a transcript of papers presented on chipped wood production and uses at a discussion conference held September 15, 1950, by the Soil Conservation Service, the Pulp and Paper Research Institute of Canada, and the Northeastern Wood Utilization Council.

Papers included are A. C. McIntyre's Wood Chips and Farming, A. Koroleff's Possibilities of Wood Chipping in Forest Management, J. T. Morgan's Stationary Chippers for Processing Low-Quality and Waste Wood, E. W. Fobes' Portable Wood-Chipping Equipment, and R. H. Fenton's A Pilot Study of the Use of Light Portable Wood Chippers; three panel discussions on brush disposal are reported on, as are 10 discussions on uses for chipped wood.

The book concludes with a complete list of manufacturers who make chippers, a report on a test made on wood chips for pulp, and a listing of other Council publications of interest to the pulp or paper manufacturer.

Booklets and Pamphlets

TEN YEARS OF MICROBIOLOGICAL RESEARCH, a summary. Published by Biological Control Committee of The American Paper and Pulp Association, 122 East 42nd St., New York 17. 18 pages. After opening with an introduction which explains the reasons for and beginnings of microbiological study of paper, this pamphlet goes on to explain the methods used in research, the sanitary aspects of paper, effect of manufacturing processes on the microbiological content of paper, the problem of slime, practical value of information resulting from research on the problem, and the conclusions reached from the research. Progress reports and publications dealing with the subject are listed.

FINANCING BUSINESS EXPANSION — The Record of Sources and Uses of Funds in the Period 1946-1949. Economic Policy Division Series No. 30, October, 1950, published by National Association of Manufacturers, 14 West 49th St., New York 20. This booklet, through the use of tables, diagrams, summaries, and interpretations of these descriptive aids, seeks to provide a picture of how industrial growth was accomplished in the post World War II years. The booklet, and its information, should be helpful in shaping future national financial policies.

ACCIDENT PREVENTION MATERIALS Service Guide 115.1. Published by Pulp and Paper Section of the National Safety Council, 425 No. Michigan Ave., Chicago 11. This four page pamphlet is a list of materials developed especially for the pulp and paper industry. Additionally, a partial list of important materials suitable for all industries is included.

REFERENCE TABLES, December, 1950. Published by Canadian Pulp and Paper Association, Sun Life Building, Montreal, P.Q., Canada. 36 pages. Ninety-nine tables give a concise and complete picture of pulp and paper operations in Canada. Divided into five sections, section "A" is concerned with forests and pulpwood, section "B" considers 1949 figures, section "C" lists pulp statistics, section "D" lists newsprint statistics, section "E" summarizes facts about other paper and paperboard, and section "F" reveals national significance of the industry.

TYPES OF LOCKNUTS and their principles of operation. Published by Locknut Section of the Industrial Fasteners Institute, 3648 Euclid Ave., Cleveland. 17 pages. After opening with a short history of the development of and need for locknuts, this booklet goes on to show with sketches and descriptions the various kinds of modern locknuts manufactured by some 11 manufacturers.

PROGRESS THROUGH WOOD RESEARCH for national defense and industry. Published by Timber Engineering Co., 1319 Eighteenth St., N.W., Washington 6, D.C. 16 pages. This booklet describes many of the more significant advances which have been made in wood utilization and quality control during the past decade; timber engineering accomplishments in improvement of existing products, development of new products, perfection of wood working tech-

Impact mills for reducing chunky or bulky materials

It takes a well designed hammer mill to grind wood edgings, small blocks, pulp lap, agricultural residues, and other materials used in pulp and paper making. That's the kind of mill you see illustrated here—one of the Bauer No. 100 Series Hammer Mills.

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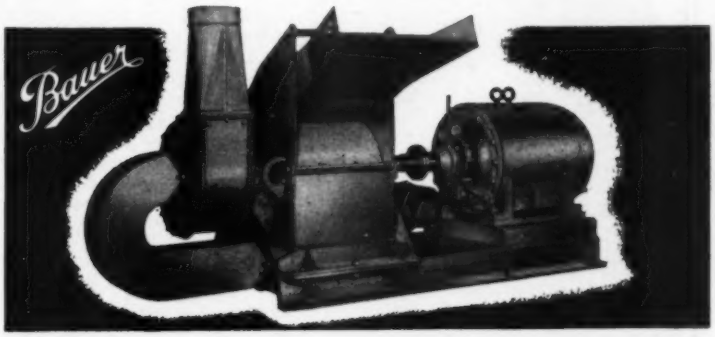

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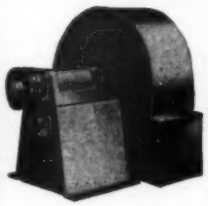

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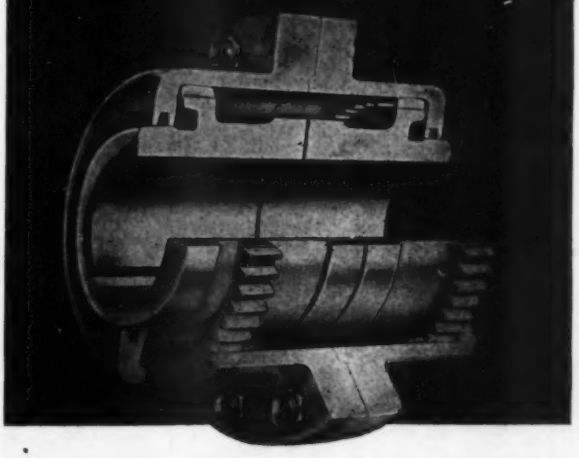

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niques, and the training of technical personnel in practical aspects of wood research are reported in detail.

UTILIZATION OF BAGASSE FOR WRAPPING AND BAG PAPER MANUFACTURE, Indian Forest Bulletin No. 148-149. Published by Forest Research Institute, Dehra Dun, India. 20 pages. Price: –/10/– or 1 *sh.* This pamphlet describes the practical possibilities for the utilization of bagasse in kraft paper and for use in multiwall bags which substitute for jute bags. Advantages of bagasse are explained; the last two pages of the pamphlet are printed on paper made with a high bagasse content.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Mechanical Seals. Garlock Packing Co., Palmyra, N.Y.—"Mechanical Seals for Rotary Shafts," 12 pages, describes standard designs in the Garlock line of rotary shaft seals, including Package, Chevron and "O" Ring types. A specification sheet for ordering is included.

Traveling Cranes. Northern Engineering Works, 2615 Atwater St., Detroit 7, Mich.—4-page illustrated Booklet S-151 describes types and applications of heavy-duty overhead materials handling equipment. References to complete catalogues on all equipment are given.

Board Forming Machine. Oliver United Filters, Inc., 33 W. 42nd St., New York, N.Y.—Bulletin No. 702, 4 pages, explains how these forming machines can be used to form board from many materials. It enumerates installations, and gives standard sizes and production figures. Photographs and diagrams show details of operation.

Regulators. Spence Engineering Co., Inc., Walden, N.Y.—A 4-page folder with information on temperature regulators, pressure regulators and desuperheaters. A complete explanation of the principles of pilot-operated regulating valves is given, as well as data on 27 Spence pilots.

Water Treatment Unit. American Well Works, Aurora, Ill.—Technical Supplement FL, 8 pages, describes the "Flocsettler" unit for water and waste treatment, and its exclusive design principles. All its operations, including mixing and slurry blending, flocculation and softening, and positive sludge removal, are described and illustrated.

Ratio Totalizer. Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.—Twelve suggested applications of the Hagan Ratio Totalizer in automatic control circuits are described and illustrated in Bulletin No. 5450, 8 pages. Functions of the Totalizer, in combining input control pressures in various ways to produce a single output control pressure, are illustrated.

Bucket Elevator. Beaumont Birch Co., 1505 Race St., Philadelphia 2, Pa.—New catalogue No. 10-B describes Beaucalloy chains, "Unicast" buckets and "Trac-Pull" traction wheels. Made of a special steel alloy, these products are designed for handling bulk materials under conditions of hard wear. Four pages and two insert diagram sheets give details and describe new design features.

Screens. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—Book No. 2354, 12 pages, illustrates and describes Link-Belt "CA" Concentric Action vibrating screens. Designated for medium and heavy duty service, their use in sizing, rinsing and dewatering is thoroughly covered, with some data in tabular form. Selection of proper screens is also described.

Pump Drives. Peerless Pump Div., Food Machinery and Chemical Corp., 301 W. Avenue 26, Los Angeles 31, Calif.—Right angle geared pump drives and their application to vertical turbine pumps is the subject of Bulletin B-140-1, a comprehensive booklet on the "Gearturbo" pump head. Applications, including combinations of electric and right angle "Gearturbo" pump heads, are suggested.

Gripping Jaws. Instron Engineering Corp., 2 Hancock St., Quincy 71, Mass.—Bulletin "Subject: New Instron Jaws," 2 pages, describes the new features of these jaws for tensile testing machines. Greater gripping efficiency is claimed. Specifications of four models are given.

Asbestos Rope. Johns-Manville, 22 East 40th St., New York 16, N.Y.—This 4-page folder concerns an inorganic asbestos rope which will not support bacterial life or contaminate water, and so can be used for packing bell and spigot joints. Plain, rubber-coated and copper-jacketed rope are described.

Acetate. Union Carbide and Carbon Corp., Niacet Chemicals Div., 1049 Niagara Bldg., Niagara Falls, N.Y.—Bulletin No. 16 on Sucrose Octa Acetate details the physical a chemical properties, latest specifications a applications of this chemical. Used for impregnating paper to make it transparent, or on boxboard to make it water- and grease-resistant.

Centrifuges. Centrifuge Mechanical Equipment, Inc., Div. of Condenser Service an Engineering Co., Inc., 95 River St., Hoboken N.J.—8-page bulletin, "CME Continuou Centrifuge," describes two types of equipme for centrifugal filtration—screen type un and solid bowl type units. They extract soli from liquids and separate immiscible liquids of unequal specific gravity. A demulsifier is also described.

Hand Trucks. Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.—A 12 page booklet describes two new powered hai trucks: the Electro-Lift, battery-power and motor driven; and the Hydro-Lift, gas-powered and driven by hydraulic pump and motor. Data concerning design and engineering of the trucks is given, and dealers are listed.

Fork Lift Trucks. Mobilift Corp., 835 S. E. Main St., Portland 14, Ore.—6-page bulletin, Form M-410, describes two new 2000-lb. capacity "Lev-R-Matic Drive" fork lift trucks. The patented multiple-disc clutch is illustrated and drive control operation explained. The two models, a stand-up and a sit-down truck, are illustrated.

Hydraulic Valve. Sarco Co., Inc., Empire State Bldg., New York 1, N.Y.—Bulletin No. 1080-A, 4 pages, describes the operation and construction of the "Sarcostat" electric hydraulic valve operator, for direct connection to 110 volts A.C., 60 cycle current. Operation of valves up to 6 in. single seated or 8 in. double seated is explained, and a table of capacities is given.

Motor-Generators. General Electric, Schenectady 5, N.Y.—An 8-page booklet, No. GEA-5506, covers motor-generator sets from 30 to 8000 kw as a source of D-C power for industry. Four typical installations are shown, and construction features of the synchronous motors and D-C generators are described.

Filtration Media. The Carborundum Co., Refractories Div., Perth Amboy, N.J.—"Porous Media" is a 56-page reference booklet covering all filtration and diffusion applications of ceramically bonded media. Charts, tables, illustrations and text give the uses, design, installation and specifications of the materials.

Overhead Handling System. Whiting Corp., Harvey, Ill.—The Whiting "Trambeam" bulletin M-20, 20 pages, lists features of the overhead crane and monorail system and tells how it may be used. A general introduction to this type of materials handling.

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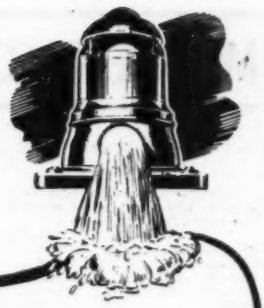

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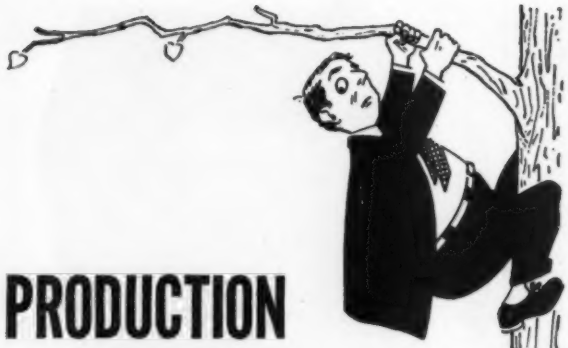

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Repacked	4.75 to 5.00
Thirds and Blues—	
Repacked	4.25 to 4.50
Miscellaneous	3.75 to 4.00
Whites, No. 1—	
Repacked	5.50 to 6.00
Miscellaneous	4.50 to 4.75
White, No. 2—	
Repacked	4.50 to 4.75
Miscellaneous	3.75 to 4.00

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ex dock New York City

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	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

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ex dock New York City

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	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

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f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	7.50 to 8.00
Domestic	8.00 to 8.50
Wool Tares—	
Light	8.00 to 8.25
Heavy	8.50 to 9.00
No. 1 Scrap Bagging	6.75 to 7.25
Manila Rope—	
No. 1 large	6.50 to 7.00
No. 1 small	5.50 to 6.00
Sisal Rope—	
No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
New Burlap Cuttings	8.50 to 9.00
Jute Threads—	
Foreign (Nom.)	7.50 to 8.00
Domestic	7.50 to 8.00
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	2.50 to 3.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	225.00—
Hard White, No. 1	190.00—
Soft White, No. 1	170.00—
Soft White, one-cut	160.00—
Soft White, Misc.	150.00—
Fly Leaf, No. 1	90.00—
Fly Leaf, Woody No. 1	70.00—
No. 2 Mixed Col. Woody	60.00—
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	60.00—
Mixed Books	35.00—
Ledger Stock—	
No. 1 White	125.00—
No. 1 Mixed (Colored)	100.00—
Manilas—	
New Env. Cuttings	135.00—
New Env. Cuts, One-Cut	—
Extra Manilas	85.00—
Manila Tab Cards, Free of Ground Wood	150.00—
Colored Manila Tab Cards	115.00—
Kraft—	
New Envelope Cuttings	160.00—
Tripled Sorted No. 1 100%	100.00—
No. 1 Old Assorted	85.00—
News—	
White Blank	125.00—
Overissue	45.00—
No. 1 Folded	40.00—
Old Corrugated Containers	62.50—
New Jute Corrugated Cuts	60.00—
Mill Wrappers	37.50—
Box Board Chips	35.00—
No. 1 Mixed Paper	35.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	85.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	42.00 to 43.00
Argentine, lb.	40.00 to 40.50
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	15.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.80 to 3.05
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.50 to .55
Litharge, powd. bbl. lb.	.18½ to .19½
Rosin (Gum)—	New York, per 100 lbs.
E	10.50—
F	10.50—
G	10.50—
WW	10.85—
Rosin (Wood), carlots,	
F.O.B. South	6.80—

MARKET QUOTATIONS

Salt Cake—		
Dom. bulk (wks) ton	22.00 to	24.00
Imp. bulks on dock—		
(Atl. ports) ton (Nom.)	25.00—	
Soda Ash—		
Bulk (works) cwt.	1.20—	
Paper bags, cwt.	1.50—	
Soda (Caustic)—		
Solid drums, cwt.	3.35 to	3.40
Ground and flake, drums, cwt.	3.75 to	3.85
Sodium Silicate—		
60 deg. 55 gal. drums, (works) cwt.	1.80 to	1.90
40 deg. 35 gal. drums, (works), cwt.	1.50 to	1.60
Starch—		
Pearl, 140 lb. bags, cwt.	5.92—	
Pearl, barrels, cwt.	5.92—	
Paper (Sp.) bags, cwt.	5.92—	
Powdered, barrels, cwt.	6.05—	
Sulphur (Crude)		
(Mine) bulk, long ton	22.00—	
Talc—		
Dom. 100 lb. bags (mine) ton	25.00 to	28.00
Canadian	35.00 to	45.00
Titanium Dioxide—		
Barium Pig, bbls., lb.	.21 to	.21½
Calcium Pig, bbls., lb.	.21 to	.21½
Zinc Sulphide, bbls., lb.	11.50 to	11.75

WOOD PULP

Prices, dollars per short, air dry, ton, with inland freight allowed, are:

Bleached sulphite, Swed.	175.00—
Bleached sulphite, Finnish	—
Bleached sulphite, dom.	135.00—
Easy bleaching sulphite	—
Unbleached kraft, Finn.	—
Unbleached sulphite, Swed.	153.00—
Unbleached sulphite, Fin.	—
Unbleached sulphite, dom.	140.00—
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Unbleached kraft, southern	140.00—
Bleached sulphate, Swed.	180.00—
Bleached soda, domestic	140.00—
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f.o.b. New York City

Boards—	per ton
Binders	140.00—
Chip	105.00—
Chip, tube and can	115.00—
Chip, full blending	117.50—
Chip, sgl. mla. lined	130.00—
Coated, white patent .016	175.00 to 185.00
.020 and heavier	165.00 to [illegible]
Kraft liner	125.00—
Filled News	107.50 to 110.00
Container	130.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	17.40—
B Grade E. F.	17.65—
A Grade S. C.	18.15—
B Grade S. C.	18.40—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White	
No. 1 Glossy	23.40—
No. 2 Glossy	21.90—
No. 3 Glossy	21.15—
No. 4 Glossy	—
No. 2 Offset	17.90—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	70.45—
100% Rag	62.45—
75% Rag	48.15—
50% Rag	38.90—
25% Rag	31.65—

Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	72.65—
100% Rag	63.90—
75% Rag	49.40—
50% Rag	40.20—
25% Rag	33.00—

Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 watermarked	19.05—
No. 2 watermarked	18.10—
No. 4 watermarked	17.10—

Sulphite Ledger—	per cwt.
No. 1 watermarked	21.15—
No. 2 watermarked	21.00—
No. 4 watermarked	20.40—

Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—	per ton
Rolls, Standard (Contract)	106.00 to 110.00
Rolls (Spot)	(Nominal)
Sheets	—

Tissues (Carlots)—	per ream
White No. 1	1.85—
White No. 2	1.65—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.70—
Manila	1.85—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	7.10—
Toilet, Unbleached (M shts.) per cs.	6.05—

Towels	per case
Bleached	6.65—
Unbleached	5.65—

Wrappings (Kraft)—	per cwt.
Super-Standard	9.25 to 9.50
No. 1 Wrapping	8.25 to 8.50
Standard Wrapping	7.75 to 8.00
Standard Bag	7.50 to 7.75
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)

Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers	
Com. Gr. Butch. 40 lb.	
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	—
Env. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrimmed ream marked, in bdls.)	—
Wrapp. Mla. 35 lb. up—	
No. 1	9.00—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B-20 lb.	—
Grade A-22 lb.	—

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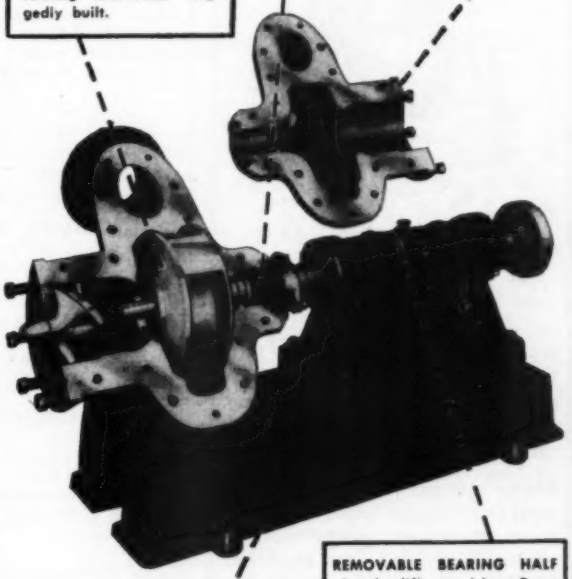

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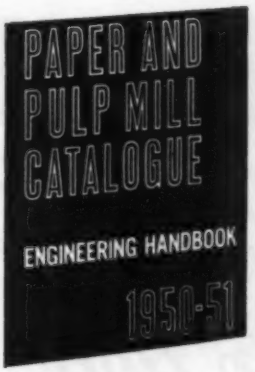

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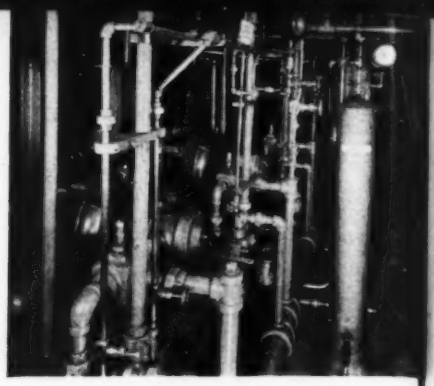

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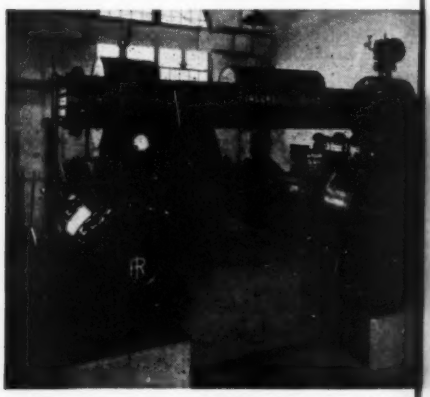

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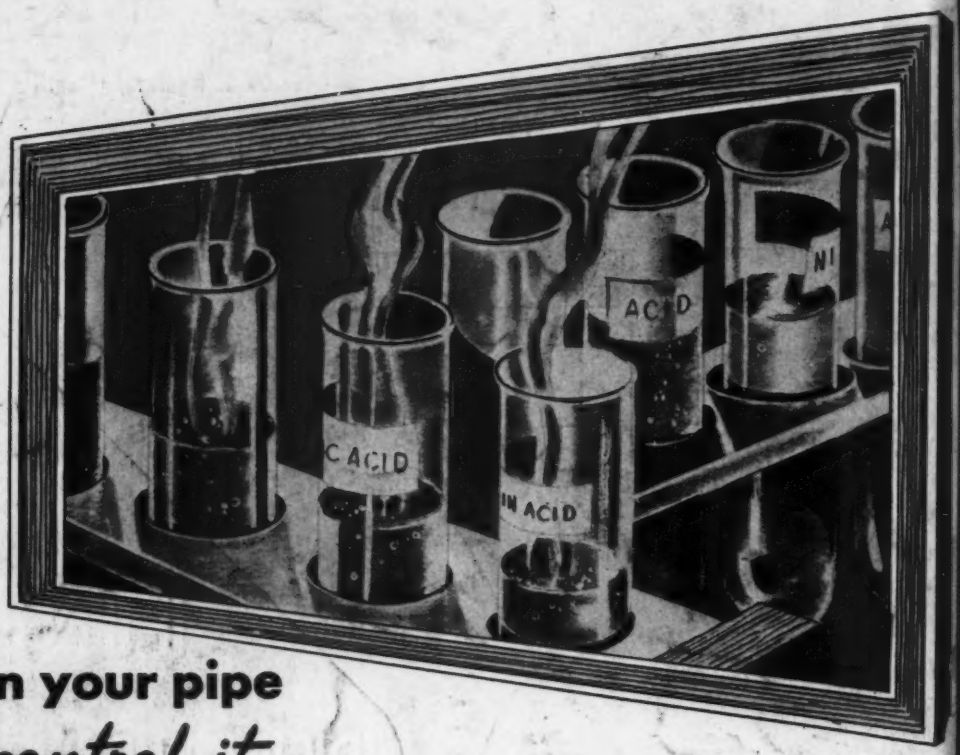

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